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RECONSTRUCTION OF BRIDGE NO. BC 8019 — ALICEANNA STREET & BRIDGE NO. BC 8020 — FLEET STREET

Type, Size & Location Study

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Introduction and Scope: In accordance with our revised price proposal dated July 9, 2012, this Type, Size and Location (TS&L) Study was performed to evaluate alternatives for the reconstruction of Bridge No. BC 8019 – Aliceanna Street over Harford Run at Central Avenue and the replacement of Bridge No. BC 8020 – Fleet Street over Harford Run at Central Avenue as part of the Central Avenue Phase II design-build project. In addition, per the request of the Baltimore City Department of Transportation (BCDOT), two (2) culvert structures along Central Avenue, Bridge Nos. BC 1255 and 1555 located between Fleet Street and Aliceanna Street and Aliceanna Street and Lancaster Street, respectively, have also been included as part of this TS&L Study. An evaluation was performed to determine feasible strengthening and rehabilitation alternatives to upgrade and improve the load carrying capacity and serviceability of each culvert to match the project bridges. Finally, an additional rigid frame culvert located north of Fleet Street on Central Avenue is also included as part of this TS&L Study Report. However, due to limited information available for this small structure (i.e., this bridge's clear span length is less than 20' between abutments), only repair recommendations have been included herein as load rating and strengthening options were not able to be evaluated effectively at this time.

Reconstruction alternatives for Bridge Nos. BC 8019 and BC 8020 were developed and evaluated in conformance with design criteria established for this project which include the following:

- Provide for a 75-year service live expectancy
- Structures shall carry two-way traffic both longitudinally (east-west) and transverse (north-south) to the centerline of each structure
- No pedestrian or bicyclist requirements
- Design based on existing roadway profile. Final profile to be set by the design-build team
- Maintain east-west traffic during construction using staged construction or a full intersection closure via detour (one bridge replaced at a time)
- Construction duration shall be minimized
- New structure shall minimize changes to the existing hydraulic opening of each structure

Rehabilitation alternatives for Bridge Nos. BC 1255 and BC 1555 were also developed and evaluated in conformance with design criteria established for this project which include the following:

- Provide for a 75-year service live expectancy
- Increase the current load rating to remove the operating rating for the Type 3 vehicle
- Minimize excavation (contaminated soils may be present)
- Minimize traffic disruptions
- Construction duration shall be minimized
- Any structure modifications shall minimize changes to the existing hydraulic opening of each structure

The following information was reviewed to develop feasible alternatives from which a recommended alternative was selected:

- Field Surveys and Topographic Mapping performed by WR&A
- 2009 and 2011 (draft) Bridge Inspection Reports
- Impacts to the surrounding area during construction
- Preliminary roadway plans developed by WR&A
- Preliminary proposed MTA Red Line Tunnel Locations under BC 8020 at Fleet Street
- Preliminary hydraulic opening analysis performed by WR&A
- Input and direction as received from Baltimore City Department of Transportation
- Existing available plans for Bridge Nos. BC 8019 and BC 8020 (see Appendix C for plans)

Project Site/Structure Description: Aliceanna and Fleet Streets are both classified as urban local roadways carrying two lanes of traffic over Harford Run. The Average Daily Traffic (ADT) over Bridge No. BC 8019 (Aliceanna Street) is 28,785 vehicles per day and over Bridge No. BC 8020 (Fleet Street) is 6,020 vehicles per day, as indicated in their respective 2009 Bridge Inspection Reports. Truck traffic comprises approximately 5% of the volume on both streets. Aliceanna Street and Fleet Street are posted for 25 MPH. The actual bridge structures are situated prominently within the intersection at Central Avenue and are oriented in the east-west direction (see Appendix A for a Location Map).

Central Avenue is classified as an urban collector carrying two lanes of traffic and runs in a north-south direction through central Baltimore City. Harford Run is parallel to and located directly underneath of Central Avenue. The portion of Central Avenue in the vicinity of Bridge Nos. BC 8019 and BC 8020 has a clear roadway width of approximately 75 feet. The Average Daily Traffic (ADT) along Central Avenue is only 3,900 vehicles per day. Central Avenue is posted for 30 MPH. Central Avenue is on a downgrade at the north approach and an upgrade at the south approach at both bridges. Central Avenue, Fleet Street, and Aliceanna Street are all on relatively tangent alignments.

Built in 1920, Bridge No. BC 8019 (see Appendix B for Existing Bridge Photographs and Appendix C for Existing Bridge Dimensions) is a single span combination concrete encased steel beam and solid concrete slab bridge supported by masonry abutments on 12" diameter timber piling installed at 4' centers. The original design live load vehicle is unknown, but it is anticipated that at a minimum, an H-20 live load vehicle was used. It is likely that the bridge was also designed to support trolley loads, but given the isolated location of this live load, it will be assumed that the H-20 vehicle was the design load for analysis purposes. Per recent survey measurements, the structure has a clear span length of 23'-3" ± with a total structure length of approximately 25'-0" (back-to-back of backwalls) and is oriented 90-degrees to the centerline of Central Avenue. The structure has an out-to-out superstructure width of 69'-7 1/2" ±. The bridge does not require traffic barriers due to its location in the center of an urban intersection.

Built in 1920, Bridge No. BC 8020 (see Appendix B for Existing Bridge Photographs and Appendix C for Existing Bridge Dimensions) is a single span concrete encased steel beam and solid concrete slab beam bridge supported by masonry abutments on 12" diameter timber piling installed at 4' centers. The original design live load vehicle is unknown, but it is anticipated that at a minimum, an H-20 live load vehicle was used. It is likely that the bridge was also designed to support trolley loads, but given the isolated location of this live load, it will be assumed that the H-20 vehicle was the design load for analysis purposes. Per recent survey measurements, the structure has a clear span length varying from 22'-5" to 23'-3" ± with a total structure length of approximately 25'-0" (back-to-back of backwalls) and is oriented 90-degrees to the centerline of Central Avenue. The structure has an average out-to-out superstructure width of 111'-5" ±. The bridge does not require traffic barriers due to its location in the center of an urban intersection.

At both bridges, Central Avenue crosses transversely in the north-south direction. Harford Run flows north to south toward the Inner Harbor. The channel approaches the bridge perpendicular to the structure. The channel bottom consists of a combination brick-lined and timber invert. Several storm drain utility pipes run parallel (i.e., east-west) to both bridges and thus pass through the existing abutments and empty into Harford Run. As such, a notable amount of moderate silt build-up has accumulated within the invert at both bridges.

These bridges are generally in fair condition. The 2009 Bridge Inspection Report observed some spalling of the concrete encased girders exposing the structural steel. These defects have not been repaired. Reference the "Existing Bridge Condition" summary on the following page.

Built in 1960, Bridge No. BC No. 1255 is a single cell reinforced concrete box culvert supported by cast in place reinforced concrete piles and is situated between Fleet Street and Aliceanna Street. The structure has a clear opening between walls of 19'-4", a 7'-0" minimum rise, and a width (or length in the north-south direction

along Central Avenue) of approximately 272'-0". The bridge does not require traffic barriers due to its location within Central Avenue.

Built in 1960, Bridge No. BC No. 1555 is a single cell reinforced concrete box culvert supported by cast in place reinforced concrete piles and is situated between Aliceanna Street and Lancaster Street. The structure has a clear opening between walls of 19'-4", a 7'-0" minimum rise, and a width (or length in the north-south direction along Central Avenue) of approximately 277'-0". The bridge does not require traffic barriers due to its location within Central Avenue.

Reconstructed in 1981, the three-sided concrete rigid frame culvert located north of the Fleet Street intersection has a clear opening of approximately 16'-8" and a width (or length in the north-south direction along Central Avenue) of approximately 302'-0".

Existing Bridge Condition: The existing condition of each structure is based on a recent biennial inspection completed by WR&A during the 2011/2012 BCDOT biennial inspection program.

Bridge No. BC 8019 on Aliceanna Street appears to be in satisfactory condition at this time. However, some defects were noted in both the superstructure and substructure. Note that the superstructure consists of eleven (11) encased steel beams north of an assumed reinforced concrete "dropped soffit" (i.e., 1N – 11N) and ten (10) encased steel beams south of the "dropped soffit" (i.e., 1S – 10S). Note however that the original plans indicated eleven (11) beams, but it is believed that one of the beams was cast into the dropped soffit, thus contributing to the 10 encased beams as identified. Documented defects include:

- Approximately 50% of the total length of the encased steel beam bottom flanges are exposed and typically exhibit areas of minor to moderate corrosion with minor section loss.
- The bottom flanges of Beam Nos. 2N and 3N are delaminated up to ¼" thick at the west end and at midspan with approximately 1/32" to 1/16" deep pitting.
- Beam No. 3N exhibits a 7'-0" long x up to ¼" wide crack along the top of the south face of the encasement at the west end.
- The bottom flange of Beam No. 7N is delaminated up to ½" thick over a length of 3'-0" at the west end.
- The bottom face of the encasement at Beam No. 10N is delaminated over the full length.
- The bottom flange of Beam No. 11N is exposed over a 10' length at the west end with heavy delamination and section loss which could not be measured (due to access limitations).
- At the locations where the encasement remains, the bottom face is typically delaminated and exhibits longitudinal cracks up to 1/8" wide along the full length.
- The exposed bottom flange of Beam Nos. 5S and 6S is delaminated up to ½" thick
- The exposed bottom flange at the east end of Beam No. 7S is delaminated up to 1" thick.
- The exposed bottom flange of Beam No. 8S exhibits heavy delamination over the full length, and the north edge of the bottom flange exhibits section loss down to a knife-edge over a length of 4'-0" at the west end.
- The concrete encasement at Beam No. 9S exhibits a 5'-0" long x up to 4" high spall on the south face at the east end.
- The concrete encasement at Beam No. 10S exhibits a 6'-0" long x up to full height spall on the north face at the east end, and a 1'-0" long x up to full height spall on the north face at the west end.
- The stone masonry abutments exhibit isolated areas of missing mortar above the waterline (however, a significant portion of the abutment face above the waterline is covered with heavy sediment and mud, so the mortar in these areas is not visible).
- Both abutments exhibit a large gap in the stone masonry surrounding the 1'-0" diameter pipe in Bay No. 8N.
- The north end of the east abutment exhibits gaps in the mortar between stones up to 1" wide at the waterline under Bay Nos. 3N and 4N.

- The brick backwalls exhibit isolated areas of missing mortar throughout.
- The soffit typically exhibits isolated areas of exposed corroded wire mesh reinforcement.
- A 1'-6" wide x 1'-0" long x 4" deep spall in the soffit between Beam Nos. 5N and 6N exists adjacent to the manhole opening at the east end.
- A 1'-0" wide x 1'-6" long x up to 7" deep spall exists in the soffit between Beam Nos. 4S and 5S adjacent to the east abutment backwall.
- There is an 8'-0" wide x 1'-8" long x up to 7" deep area of spalling with exposed corroded wire reinforcement in the soffit between Beam Nos. 5S and 6S at the west end (this spalling appears to have been caused by three (3) 2" diameter deck cores taken between the beams at approximately 2'-0" spacing).
- The soffit exhibits areas of minor spalling up to 1" deep with exposed corroded wire reinforcement over the east half of Bay Nos. 6S and 9S.

Bridge No. BC 8020 on Fleet Street appears to be in satisfactory condition at this time and does have similar defects as those documented for Bridge No. BC 8019. Bridge No. BC 8020 also has some defects that were noted in both the superstructure and substructure. Note that the superstructure consists of thirteen (13) encased steel beams to the north of a series of concrete slab beams (i.e., 1N – 13N) and six (6) encased steel beams to the south (i.e., 1S – 6S). The middle section of the superstructure consists of seven (7) concrete slab beams, denoted as 1M – 7M. Documented defects include:

- Approximately 95% of the total length of the encased steel beam bottom flanges are exposed over the full or partial bottom flange width and typically exhibit areas of corrosion and delamination. Any remaining portions of the concrete encasement along the bottom flanges are delaminated.
- The concrete encasement at Beam No. 1N exhibits a full length x up to 3" high spall along the south face.
- There are two (2) conduits in Bay No. 4N; the south conduit and support are broken and hanging down. The south half of the bottom flange of Beam No. 4N exhibits heavy section loss adjacent to the conduit.
- There is an exposed corroded reinforcing bar with 100% section loss along the south face of Beam No. 5N.
- The concrete encasement at Beam No. 6N exhibits a 4'-0" long x up to 4" high spall along the north face.
- The concrete encasement at Beam No. 8N exhibits a 5'-0" long x up to 4" high spall at the west end of the south face.
- The concrete encasement at Beam No. 10N exhibits a full length x up to 6" high spall along the south face with an exposed corroded reinforcing bar over a 4'-0" length near midspan.
- The concrete encasement at Beam No. 12N is delaminated over the full height of the north face for a 7'-0" length near the west end.
- The concrete encasement at Beam No. 13N exhibits a full length x up to 6" high spall along the north face with a 4'-0" long area of heavy delamination along the north edge of the bottom flange at the east end.
- The seven (7) adjacent voided slab sections in the middle of the bridge (Slab Nos. 1M-7M) are in fair condition. Slab Nos. 1M and 2M are delaminated and spalled up to 3 ½" deep throughout with exposed corroded reinforcement, particularly exposed longitudinal bars. Slab No. 1M exhibits an isolated area with one completely exposed corroded longitudinal bar and adjacent bars with section loss.
- Slab No. 4M exhibits delaminated areas throughout a 3'-0" length at the west end and heavy honeycombing at the east end.
- Slab No. 5M exhibits an 8'-0" long x up to full width delaminated area at midspan with a spall up to 2" deep with exposed corroded reinforcement.
- Slab 7M exhibits spalling up to 2'-0" deep in three (3) isolated areas along the south edge with rust stains.

- The six (6) concrete encased steel beams at the south end of the bridge (Beam Nos. 1S-6S) are in fair condition. Approximately 25% of the total length of the encased steel beam bottom flanges are exposed over the full or partial flange width and typically exhibit minor to moderate corrosion and delamination. The bottom face of the concrete encasement at each beam exhibits areas of delamination along the full length.
- The bottom face of the concrete encasement at Beam Nos. 2S-6S exhibits cracks up to ½" wide near midspan.
- The concrete encasement at Beam Nos. 4S and 5S exhibits a 12'-0" long x up to 5" high spall on the south face at the west end.
- The concrete encasement at Beam No. 6S exhibits a 5'-0" long x up to 5" high spall on the north face at the west end. The exposed bottom flange exhibits heavy delamination on the top and bottom faces with section loss which cannot be measured due limited access.
- The stone masonry abutment joints typically exhibit minor amounts of missing mortar in isolated areas along or just above the waterline.
- The west abutment steps out between the north end and Beam No. 4N, decreasing the clear width of the channel opening. The west abutment stones in this area are separated up to 1 ½" between Beam Nos. 1N and 4N, and the south 2'-7" of the stepped out portion has shifted slightly to the south.
- The east abutment exhibits areas of deteriorated mortar between the north end and Beam No. 4N with a gap up to ¾" wide between the mortar and stones under Beam No. 3N where the south end has shifted slightly to the south.
- There is a large gap up to 10'-0" long x 3'-0" high x 1'-0" deep where missing stones expose the brick in the east abutment under Slab Nos. 3M and 4M. The west abutment exhibits a crack up to 1/16" wide in the stone with missing mortar under the joint between Slab Nos. 5M and 6M.
- At the north set of beams, the soffit in Bay No. 4N is deteriorated and spalled up to 4" deep throughout due to the conduit in this bay.
- The soffit exhibits a spall up to 1'-0" in diameter x 1 ½" deep in Bay No. 5N at midspan.
- The soffit exhibits a delaminated area up to 9" in diameter in Bay No. 9N near midspan.
- The soffit exhibits a delaminated area up to 6" in diameter next to an area of exposed corroded wire mesh reinforcement in Bay No. 11N at midspan.

Based on the condition of each superstructure and the age of each bridge (over 90 years old), it does not appear that each bridge can safely support current and future loads for another 75 years (i.e., the required service life expectancy for new bridges). Therefore, at a minimum, the superstructure of each bridge should be replaced as part of this project.

Bridge No. BC 1255 appears to be in satisfactory condition at this time. Some minor defects were observed, however, and included the following:

- The concrete at the construction joints typically exhibits hairline cracking with water leakage, rust staining, and efflorescence.
- There is random hairline map cracking in the east wall with light efflorescence.
- There is light scaling of the culvert walls along the waterline throughout.
- There are random longitudinal hairline cracks in the underside of the top slab.
- There are sixteen (16) full width transverse hairline cracks with moderate efflorescence and rust staining at random locations in the underside of the top slab. The majority of these cracks extend through the full height of the culvert walls.
- There is heavy hairline map cracking throughout the underside of the top slab at the fourth (4th) and fifth (5th) segments from the north end of the culvert.
- There are two (2) spalls in the underside of the top slab at the sixth (6th) joint from the south end measuring up to 1'-0" long x 3" wide x 3" deep.

- There is a storm pipe outlet in the west wall of the culvert located approximately 20' from the south end of the culvert. The concrete surrounding the pipe is spalled (i.e., via jack hammer) with mortar repair patches at locations.

Based on the biennial inspection findings, the two (2) spalls in the underside of the top slab at the sixth (6th) joint from the south end and the spalled concrete surrounding the storm drain pipe outlet in the west wall of the culvert should be repaired and the work included with the contract performing the bridge reconstruction work specified elsewhere herein.

Bridge No. BC 1555 also appears to be in satisfactory condition at this time. Some minor defects were observed, however, and included the following:

- There are random areas of honeycombing throughout the top slab and culvert walls.
- There are random vertical hairline cracks, some with light efflorescence, at locations throughout the culvert walls.
- There are random areas of hairline map cracking in the haunches.
- There are random longitudinal hairline cracks in the underside of the top slab. There are sixteen (16) full width transverse hairline cracks with moderate efflorescence and minor rust staining in the underside of the top slab. Several of these transverse cracks in the underside of the top slab extend through the haunches and culvert walls.
- The construction joints typically exhibit water leakage, rust staining, efflorescence, and hairline cracking to the adjacent concrete of the underside of the top slab.
- The underside of the top slab has a full width x 1'-0" long area of delaminated concrete with shallow spalls and hairline cracks with rust stains located ten feet (10 ft.) from the south end of the culvert.
- There is a 1'-0" long x 10'-0" wide area of delaminated concrete with shallow spalls and hairline cracks with rust staining located 20' from the south end of the culvert in the underside of the top slab.
- There is a 1'-8" wide x 1'-8" long x 3" deep spall with exposed reinforcement in the underside of the top slab located approximately 30' from the south end of the culvert at mid-width.
- There is a 1'-6" wide x 9" long x 4" deep spall with exposed reinforcement in the underside of the top slab located two feet (2 ft.) from the west wall and approximately 50' from the south end of the culvert.
- There is one (1) storm pipe outlet in the east wall of the culvert and three (3) storm pipe outlets in the west wall of the culvert. There are spalls with exposed and corroded reinforcement surrounding the entire circumference of the northern-most and southern-most storm pipes in the west wall.

Based on the biennial inspection findings, the delaminated and spalled concrete in the underside of the top slab of the culvert should be repaired and the work included with the contract performing the bridge reconstruction work specified elsewhere herein.

The existing rigid frame culvert located between Eastern Avenue and Fleet Street is in fair condition at this time. A few major defects were documented and include the following:

- Apparent shear cracks are located on the south face of the culvert transition to the Fleet Street bridge structure; cracks were measured to be up to 1 ¼" wide and exist at both the west and east sides of the rigid frame with over 1' of lateral penetration noted (see photos on the following page). No significant defects were documented on the slab underside, however.
- Miscellaneous spalling and cracking in the walls, top slab underside, and pipe outlets



Analysis of Existing Bridges: The existing bridge on Aliceanna Street was analyzed to determine if the existing stone masonry abutment/timber pile substructure units have adequate capacity to remain in service and support a new superstructure designed for current loads. Using the 2012 AASHTO LRFD Code (6th Edition), all applicable proposed loads were applied to the existing substructure to determine if it had adequate structural capacity to support the new superstructure. The major contributing superstructure loads, comprised of a 24” deep superstructure (assuming an 18” deep solid prestressed concrete slab beam with a 6” minimum thickness composite concrete deck topping and a varying bituminous wearing surface) supporting an HL-93 live load, were added to the weight of the stone masonry abutments. Note that an additional live load case, that of dual tandem axles crossing the bridge in the north-south direction (i.e., two trucks passing through the intersection) were also analyzed to determine the proposed live loads being applied to the new superstructure. The weight of the stone masonry abutments were estimated using the best available plan information and ranged in thickness (i.e., width in the longitudinal direction) between 3’-10” and 5’-6”. The proposed loads were compared against the original design loads using an assumed concrete encased steel beam superstructure and an H-20 live load (H-20 live load was used since the bridges was constructed before 1944, or pre-HS-20 loading). A portion of the structure originally carried trolley cars in the early part of the twentieth century, but for the purposes of this analysis, only the H-20 live load vehicle was utilized as the original design vehicle. The analysis results indicate that the proposed loads on each timber pile are approximately 44% higher than the existing. In addition, the analysis of the total lateral load per pile (i.e. resulting from braking forces, earth pressure, etc.) produces excessive deflection at the head of the pile. While the Fleet Street bridge was not specifically analyzed, similar results are expected due to its similar geometry and configuration to the Aliceanna Street bridge. Reference the following summary table for additional information:

¹**Existing Timber Pile Load Summary Table – Bridge No. BC 8019 (Aliceanna Street)**

Loading per Pile (4’ c/c)	Existing	Proposed	% Increase	Remarks
Axial Dead Load	39.92 ^k	47.86 ^k	20%	Unfactored loads
² Axial Live Load	10.88 ^k	25.32 ^k	133%	Unfactored loads
Total Axial Load	50.80 ^k	73.20 ^k	44%	Unfactored loads
Total Moment	114.3 ^{ft-k}	164.70 ^{ft-k}	44%	CL bearing eccentric to piles

¹ Existing and proposed timber pile loads are similar for Bridge BC 8020 (Fleet Street).

² The controlling live load case for the existing condition is the H-20 vehicle. For the proposed condition, the controlling live load case is a dual tandem (i.e., for trucks driving north and south along Central Avenue crossing the bridge transversely).

The existing culverts on Central Avenue (BC 1255 and BC 1555) were also analyzed and the results were in general conformance with the load rating table values contained in the 2009 biennial inspection report provided by the City. The results indicated that each culvert did not rate out for the MD Type 3 vehicle at the inventory rating value (Note: both bridges are inspected annually as they are not load posted for this vehicle). Based off of the best available existing plan information, and an analysis of each culvert applying the MD Type 3 live load

vehicle, the moment in the top slab appears to be the controlling load rating case. As a result, strengthening of the top slab is warranted. The load ratings can be summarized as follows for each bridge (ratings are identical for both culverts):

¹**Existing Load Rating Summary Table – Bridge Nos. BC 1255 and 1555**

Vehicle	Gross Vehicle Weight	Inventory (Tons)	Operating (Tons)	Remarks
H-15	15	24	39	
HS-20	36	44	70	
Type 3	33	24	39	Bridges inspected annually
Type 3S2	40	44	70	

¹ Taken from the 2009 Biennial Inspection Report as prepared by others and provided to WR&A by the BCDOT.

The existing rigid frame culvert located north of Fleet Street was unable to be load rated due to inadequate plan information (i.e., incomplete reinforcing steel bar size and spacing were shown on the available plans). Note that the rigid frame culvert is not considered a bridge per NBIS criteria since the clear opening between abutments is less than 20'-0". The field inspection completed in June 2012 measured it as 16'-9" (±).

Bridge Hydraulics: Harford Run exists in a relatively straight channel section. The existing abutments are oriented parallel to the flow of the channel. Hydraulic analyses completed as part of the Central Avenue Phase I storm drain repair and updated for the current Phase II project indicate that the existing available hydraulic opening has adequate capacity to pass a 100 year storm event with more than one foot of freeboard. As a result, the new superstructure could be designed using a deeper superstructure section than the existing, if necessary, to enhance structural efficiency.

Bridge Replacement Alternatives: Various types of structures were investigated to determine the structure type that is both appropriate for this project site and meets the project constraints. Timber and steel type bridges were quickly eliminated because of the corrosive environment of Harford Run and the potentially longer construction duration associated with each system. Cast-in-place concrete type bridges with primary load carrying members consisting of cast-in-place concrete were also quickly eliminated based on the goal of minimizing the construction duration of this project. Precast concrete type bridges are both appropriate for this project site and meet the project constraints; therefore, two (2) alternatives using this type of bridge were investigated at each location. All alternatives were analyzed for an HL-93 live load combination travelling both parallel and transversely to the structure. However, the controlling live load was the side-by-side tandems travelling along Central Avenue (or transverse to the longitudinal centerline of each bridge).

All bridge alternatives studied provide a clear roadway width to match the existing clear distance between the existing stone masonry abutments at each bridge. The first alternative studied, A-1 and F-1 for the Aliceanna and Fleet Street bridges, respectively, utilizes the existing foundations and abutments. Constructing a new superstructure for each bridge on top of the existing abutments will result in a span length of approximately 25'-0" c/c of bearing. The second alternative studied, A-2 and F-2 for the Aliceanna and Fleet Street bridges, respectively, utilizes new reinforced concrete abutments supported by deep foundations constructed directly behind the existing masonry abutments. Based off of the existing available plans, it appears that the existing west and east abutments are approximately 5'-6" and 3'-10" wide, respectively, at the Aliceanna Street bridge and 4'-3" wide at both abutments of the Fleet Street bridge. *Note that these dimensions have not been verified and must be confirmed by the Design-Build Team selected for this project during the final design process.*

Based off the assumed abutment locations, constructing behind the existing abutments will result in span lengths of approximately 37'-0" and 42'-0" c/c of bearing for the Aliceanna Street and Fleet Street bridge locations, respectively. All of the alternatives utilize a typical section consisting of adjacent 48"x18" prestressed concrete solid slab beams with a composite 6" (minimal) thick reinforced concrete slab. These solid slabs were selected

due to their minimal depth compared to other available structural members within the precast prestressed concrete family. Shallower members were selected in an attempt to reduce potential adverse impacts on the available hydraulic opening of each structure. Selection of these beams does allow the 100-year storm to pass underneath each structure with a minimum of one foot of freeboard.

The alternatives studied for the Fleet Street bridge must also consider the presence of the future MTA Red Line tunnel during the proposed construction since its current alignment is directly underneath the existing bridge. The future MTA Red Line tunnel is to be of twin-bore construction and centered about Fleet Street. A new underground station is also proposed just east of the intersection with Central Avenue. As such, the new abutments for Alternative F-2 (i.e., building behind the existing abutments using new piles) were analyzed to determine if they could be installed and avoid adverse impacts to the future tunnel construction. The tunnels are approximately parallel to Fleet Street and have a 58'-6" out-to-out width. The top of the tunnels are currently set at El. -54.84 ±, or 52.34 feet below the existing invert of Harford Run. Consultation with the design team responsible for the future Red Line tunnels indicated that driven friction piles could be installed above the tunnels as long as the pile tips were at least 10' above the tunnel, though 15' is preferred, if possible.

To minimize the impact to the tunnels and avoid distress to the bridge foundations caused by the future tunneling operations, several types of foundations were analyzed to determine the most efficient method of supporting the structure. Drilled shafts supporting a grade beam provided a method of spanning over the tunnels. However, a long grade beam would be required to span the tunnels and provide enough clearance between the drilled shafts and the tunnel edges. The grade beam would be of significant size and create traffic disruptions along Fleet Street during its construction. In addition, the spoils from the drilled shafts and grade beam excavation are assumed to contain contaminated soils. Proper disposal of these soils will increase the cost of the project. A subsequent preliminary design determined that pipe piles (friction) driven to a depth a minimum of ten feet (10 ft.) above the top of the future tunnels would provide sufficient support of the structure while minimizing the impact to the tunnels. Two (2) rows of piles with a concrete cap supporting a stub abutment stem was determined to be the most appropriate option to support the superstructure given the anticipated loads, soil conditions, and drivability.

The following bridge alternatives were preliminarily designed in accordance with the AASHTO LRFD Bridge Design Specifications dated 2012 (6th Edition). See Appendix D for a General Plan and Elevation and Typical Section drawing for each alternative. See Appendix E for the corresponding construction cost estimates. Alternatives A-1 and A-2 consist of the options investigated for BC 8019 at Aliceanna Street. Alternatives F-1 and F-2 consist of the options investigated for BC 8020 at Fleet Street.

Alternative A-1 – Prestressed Precast Concrete Solid Slab Beams using the Existing Abutments: This alternative consists of a single-span prestressed precast concrete slab beam bridge with a cast-in-place composite concrete deck topping. The bridge typical section consists of seventeen (17) 48" wide x 18" deep solid slab beams spanning 25'-0", c/c bearing, spaced at 4'-0½" with 5" minimum to 8" maximum overhangs. The beams will be supported by the existing masonry abutments on timber piles. The approximate top 2'-0" of masonry is to be removed and replaced with new concrete doveled into the existing masonry and poured to the required beam seat elevation for the new slab beams. The substructure will become a semi-integral abutment to eliminate transverse roadway joints at the bearings. There will be 10'-0" long approach slabs at each end of the bridge supported by sleeper slabs. The prestressed concrete was designed with a minimum 28-day strength (f'_c) of 7,000 psi and a release strength (f_{ci}) of 5,700 psi. This alternative uses a 6" thick minimum reinforced composite concrete deck slab with a final 28-day strength (f'_c) of 4,500 psi.

The following are advantages and disadvantages of Alternative A1 related to the other alternatives studied:

Advantages:

- Lowest cost of the two (2) alternatives studied for BC 8019.

- Minimal impact to the waterway since the existing abutments will not be removed.
- Minimal construction time since the existing abutments will be used to support the proposed superstructure.
- Requires minimal excavation because the existing abutments are being maintained; also minimizes the amount of cost required to handle contaminated soil.
- Minimal maintenance costs throughout the life of the structure.

Disadvantages:

- The proposed superstructure dead and live loads are 44% higher than the assumed existing/original design gravity loads and the piles do not have adequate capacity to resist the lateral loads. As a result, the existing timber piles may be overstressed by the proposed loads.
- Does not ensure a 75-year service life.
- Deeper beams (compared to the original girder depths) minimize the vertical clearance between bottom of the beams and the existing channel invert.

Alternative A-2 – Prestressed Precast Concrete Solid Slab Beams using New Abutments: This alternative consists of a single-span prestressed precast concrete girder beam with a cast-in-place composite concrete deck. The bridge typical section consists of seventeen (17) 48" wide x 18" deep solid slab beams spanning 37'-0", c/c bearing, spaced at 4'-0½" with 5" minimum to 8" maximum overhangs. The beams will be supported by reinforced concrete integral abutments supported by a single row of steel H or pipe bearing piles. There will be 10'-0" long approach slabs at each end of the bridge supported by sleeper slabs. The prestressed concrete was designed with a minimum 28-day strength (f'_c) of 7,000 psi and a release strength (f_{ci}) of 5,700 psi. This alternative uses a 6" thick minimum reinforced concrete deck slab with a final 28-day strength (f'_c) of 4,500 psi.

The following are advantages and disadvantages of Alternative A-2 related to the other alternatives studied:

Advantages:

- Abutment and foundation capacity is well defined as compared to Alternative A-1.
- Minimal impact to the waterway since the existing abutments will not be removed.
- Minimal maintenance costs throughout the life of the structure.

Disadvantages:

- More expensive compared to Alternative A-1.
- Longer project duration due to the construction of new abutments.
- Deeper beams (compared to the original girder depths) minimize the vertical clearance between bottom of the girders and the existing channel invert.

Alternative F-1 – Prestressed Precast Concrete Solid Slab Beams using the Existing Abutments: This alternative consists of single-span prestressed precast concrete slab beam "dual" bridges with cast-in-place composite concrete decks. The North bridge typical section consists of seven (7) 48" wide x 18" deep solid slab beams spanning 25'-0", c/c bearing, spaced at 4'-0½" with an 8" maximum overhang at the center longitudinal joint adjacent to the South bridge and a varying overhang near the longitudinal joint adjacent to the existing rigid frame culvert. The South bridge typical section consists of twenty (20) 48" wide x 18" deep solid slab beams spanning 25'-0", c/c bearing, spaced at 4'-0½" with an 8" maximum overhang near the North bridge and a varying overhang near the existing culvert (Bridge No. BC 1255). There is a 1" wide center longitudinal joint separating the structures. The beams will be supported by the existing masonry abutments on timber piles. The approximate top 2'-0" of masonry is to be removed and replaced with concrete doweled into the existing masonry and poured to the required beam seat elevation. The substructure will become a semi-integral abutment to eliminate transverse roadway joints at the bearings. There will be 10'-0" long approach slabs at each end of the bridge supported by sleeper slabs. The

prestressed concrete was designed with a minimum 28-day strength (f'_c) of 7,000 psi and a release strength (f_{ci}) of 5,700 psi. This alternative uses a 6" thick minimum reinforced concrete deck slab with a final 28-day strength (f'_c) of 4,500 psi.

The following are advantages and disadvantages of Alternative F-1 related to the other alternatives studied:

Advantages:

- Lowest cost of the two (2) alternatives studied for BC 8020.
- Minimal impact to the waterway since the existing abutments will not be removed.
- Minimal construction time since the existing abutments will be used to support the proposed superstructure.
- Minimal maintenance costs throughout the life of the structure.
- Shallower beams (compared to the original girder depths) increase the vertical clearance between the bottom of the superstructure and the existing channel invert.

Disadvantages:

- The proposed superstructure dead and live loads are 44% higher than the assumed existing/original design gravity loads and the piles do not have adequate capacity to resist the lateral loads. As a result, the existing timber piles may be overstressed by the proposed loads.
- Does not ensure a 75-year service life.

Alternative F-2 – Prestressed Precast Concrete Solid Slab Beams using New Abutments: This alternative consists of single-span prestressed precast lightweight concrete slab beam “dual” bridges with cast-in-place composite concrete decks. The North bridge typical section consists of seven (7) 48" wide x 18" deep solid slab beams spanning 42'-0", c/c bearing, spaced at 4'-0½" with an 8" maximum overhang at the center longitudinal joint near the South bridge and a varying overhang near the longitudinal joint near the existing culvert. The South bridge typical section consists of twenty (20) 48" wide x 18" deep solid slab beams spanning 35'-0", c/c bearing, spaced at 4'-0½" with an 8" maximum overhang near the North bridge and a varying overhang near the existing culvert (Bridge No. BC 1255). There is a 1" wide longitudinal joint separating the structures. The beams will be supported by reinforced lightweight concrete semi-integral abutments supported by two (2) rows of steel pipe friction piles. There will be 10'-0" long lightweight concrete approach slabs at each end of the bridge supported by sleeper slabs. The prestressed concrete was design with a minimum 28-day strength (f'_c) of 7,000 psi and a release strength (f_{ci}) of 5,700 psi. This alternative uses a 6" thick minimum reinforced lightweight concrete deck slab with a final 28-day strength (f'_c) of 4,500 psi. Lightweight concrete was used in the substructure to keep the dead load as low as possible and ensure that the proposed friction piles could be installed to support the new bridge without violating the maximum tip elevation of -40.0 above the future MTA Redline tunnels.

The following are advantages and disadvantages of Alternative F-2 related to the other alternatives studied:

Advantages:

- Abutment capacity is well defined when compared to Alternative F-1.
- Minimal impact to the waterway since the existing abutments will not be removed.
- Minimal maintenance costs throughout the life of the structure.
- Shallower beams (compared to the original girder depths) increase the vertical clearance between the bottom of the superstructure and the existing channel invert.

Disadvantages:

- More expensive compared to Alternative F-1.
- Longer project duration due to the construction of new abutments.

Recommendations: Based upon a review of the various bridge replacement alternatives, WR&A recommends Alternatives A-2 and F-2 for BC 8019 and BC 8020, respectively. Although these options are more expensive compared to using the existing abutments, these alternatives provide confidence in the ability of the abutments to carry the design loads of the superstructure, ensure that the completed structures will have a service life expectancy of 75 years, and minimize the unknowns and potential construction duration and costs increases when reconstructing a bridge and incorporating existing components. In addition, re-using the existing abutments and timber piles (i.e., Alternatives A-1 and F-1) presents several factors affecting the design that are unknown at this time. Based on the best available plans, preliminary analysis has determined that the piles do not have the required capacity to support the proposed superstructure loads. Extensive field investigations would be needed to verify the available plans and to determine the condition of the existing abutments and timber piles. The cost for Alternative A-2 is \$944,000 (not including roadway and site costs) and the cost for Alternative F-2 is \$1,949,000 (not including roadway and site costs).

Maintenance of Traffic: For this TS&L Study, it has been assumed that vehicular and pedestrian traffic on Aliceanna Street and Fleet Street must be maintained during the construction of each bridge but with lane closures and/or traffic detours permitted on Central Avenue for major work items (e.g., material delivery, pile driving, bridge demo, girder erection, etc.). This assumption requires that any reconstruction of the Aliceanna and Fleet Street bridges must be completed utilizing staged construction, preferably only in two (2) stages.

The replacement of BC 8019 at Aliceanna Street will be completed utilizing staged construction in order to keep the roadway open to traffic during construction. The staging limit of construction is proposed to be located just to the north of the centerline of Aliceanna Street to avoid partial removal of the existing dropped concrete soffit section; the available plans do not clearly indicate the composition of this section and as such the removal limits have been set to avoid potential construction difficulties with this unknown component of the superstructure. Despite the asymmetric staging limits, this sequence will allow for two-way traffic during the work. However, to accommodate two-way traffic, parking along Aliceanna Street east and west of the vicinity to Central Avenue will be lost for a majority of the construction duration.

The replacement of BC 8020 at Fleet Street will be completed utilizing staged construction in order to keep the roadway open to traffic during construction. The staging limit is placed in the westbound travel lane of Fleet Street to allow the existing bridge to be removed at the interface between superstructure types (i.e., concrete encased steel beams and a concrete slab); the available plans do not clearly indicate the composition of this section and as such the removal limits have been set to avoid potential construction difficulties with this unknown component of the superstructure. Stage I construction will allow the eastbound travel lane and parking lane to be utilized to maintain traffic in both directions. Stage II construction will need to be performed with a single lane open to traffic. Traffic can be maintained through the use of temporary signals to alternate the eastbound and westbound traffic through the intersection. However, to accommodate two-way traffic, parking along Fleet Street east and west of the vicinity to Central Avenue will be lost for a majority of the construction duration.

Traffic on Central Avenue will be detoured during all phases of construction that involve the actual removal and replacement of the superstructure at each intersection. Accelerated Bridge Construction (ABC) techniques can be utilized to reduce the time that any detour is in place. Examples of ABC techniques include installing abutment piles prior to demolition and utilizing precast concrete elements for the abutments and/or superstructure. Note that several local City routes are located parallel to Central Avenue that will allow northbound and southbound traffic to be detoured safely around the work zone.

To maintain continuous eastbound and westbound traffic along both Aliceanna and Fleet Streets during the entire construction duration, erection of a temporary bridge may be considered. Installed in the very center of the intersection and sized to provide two (2) ten foot wide lanes (20' clear roadway width on the bridge), traffic can be moved to the very center of the intersection while the north and south outside portions of the existing bridges are reconstructed. In this manner, on-street parking is maintained throughout construction. Once the new "north" and south" portions of the bridge are reconstructed, the temporary bridge can be removed and the

middle section reconstructed. This option allows traffic and parking to be maintained on both Aliceanna and Fleet Streets during the entire construction duration. Traffic on Central Avenue must be detoured, however.

Minimization of Construction Duration: Per design criteria established by the BCDOT, to minimize the construction duration, and enhance long term serviceability and minimize future maintenance costs, the alternatives studied utilize ABC techniques where possible. For example, precast prestressed concrete solid slab beam superstructure elements will be used to replace the encased steel beam and concrete slab/soffit units currently in place. This will minimize impacts to the waterway as well as save construction time by providing a working surface for the construction of the concrete deck topping without the need for temporary shoring as well as allowing traffic to traverse the slab beams even before the final topping is applied (if required, temporary fill can be placed to grade to maintain traffic over the newest portions of the proposed bridge). All alternatives studied will maintain portions of the existing abutments in place to reduce the quantity of excavation and demolition and thus save time. Furthermore, abutment piles can be installed in off peak hours even before any demolition and or reconstruction work has started. Areas with piles pre-installed can be plated over and/or filled in with asphalt to maintain full traffic patterns at each intersection. Precast abutment footings and caps/stems can also be incorporated to minimize construction duration.

Culvert Rehabilitation Alternatives: Various methods have been considered to rehabilitate the existing culverts along Central Avenue or, Bridge Nos. BC 1255 and 1555 located between Fleet Street and Aliceanna Street and Aliceanna Street and Lancaster Street, respectively. The goal is to ensure long term serviceability of each structure to match that of Bridge Nos. 8019 and 8020 on Aliceanna and Fleet Streets, respectively, or 75 years, but also increase the load carrying capacity so that each culvert rates out for all legal loads (especially the Type 3). As such, any rehabilitation program recommendations must also include strengthening into the possible alternatives. Feasible strengthening options include:

- Alternative C-1: Replace culverts in-kind using cast-in-place or precast concrete structures
- Alternative C-2: Replace top slabs using cast-in-place or precast concrete structure elements. Miscellaneous spall and crack repairs are also included
- Alternative C-3: External reinforcement utilizing conventional reinforcement doweled into the top slab of each culvert with a cast-in-place section added to the top side of the top slab to increase the moment capacity. Miscellaneous spall and crack repairs are also included
- Alternative C-4: External reinforcement utilizing conventional reinforcement doweled into the top slab of each culvert with a cast-in-place section added to the underside to increase the moment capacity. Miscellaneous spall and crack repairs are also included
- Alternative C-5: External reinforcement utilizing carbon fiber reinforced polymer (FRP) strips bonded to the underside of the top slab of the culvert. Miscellaneous spall and crack repairs are also included

Recommendations: Alternatives C-1 and C-2 are the most expensive alternatives and require excavation, involve issues with proper disposal of potential contaminated soil, require MOT along the entire length of Central Avenue that could disrupt the lane closures needed for the Streetscape project, and increase project duration. Based on a cost of approximately \$225/SF, replacement of the culverts could be over \$2,500,000. Alternatives utilizing external reinforcement doweled into the top slab involve the significant drilling and insertion of dowels. The cost for doweling and placing concrete alone could be over \$350,000 and coupled with the need to perform open excavation along Central Avenue, Alternative C-3 is not cost effective. Similarly for Alternative C-4, the cost for doweling and placing concrete is over \$350,000 and also results in a reduction in the hydraulic opening. As a result, both alternatives have been discarded from further consideration. The remaining alternative, C-5, provides for a simpler method to strengthen the culverts and do so with minimal MOT, no excavation, or reduction in the hydraulic opening. Based off of prior project history, the cost to strengthen both culverts is estimated at \$218,750. Note that the external strengthening/reinforcing using FRP strips is currently proposed for another BCDOT project; FRP is being used to repair a damaged prestressed

concrete I-beam as part of the Immediate Repairs to the Broening Highway over Colgate Creek bridge project. As such, Alternative C-5 is recommended for strengthening Bridge Nos. BC 1255 and 1555.

However, if preferred, each culvert may remain in-service with only miscellaneous spall and crack repairs performed to ensure long-term structure serviceability. This requires that the current annual inspection cycle be maintained to monitor the structures for any stress related to potential overloads.

Structural Lining: A third alternative has been evaluated to provide another means to reconstruct Bridge Nos. BC 8019 and 8020 as well as strengthen Bridge Nos. BC 1255 and 1555. Based on the concept developed for the Phase I reconstruction of Central Avenue (TR08310), a structural lining alternative is available to meet the desired design criteria. The method of lining is based on hand-wound or machine-wound spiral pipe renewal procedures and requires minimal staging areas to implement and will not create the need to detour traffic along Central Avenue at Aliceanna and Fleet Streets during the construction. This option is the most expensive of all presented alternatives (\$3,583,000), but has been included for potential consideration given the difficulties in maintaining traffic along Central Avenue as a result of the bridge construction at Aliceanna and Fleet Streets. Reference Appendix D for schematic plans of this alternative.

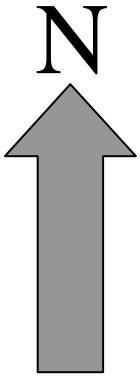


Appendix A

LOCATION MAP

LOCATION MAP

SCALE: 1" = 1,000'



Concrete Rigid
Frame Small
Structure

BC 8020

BC 1255

BC 8019

BC 1555

Structure Locations for
Central Avenue over
Harford Run

ADC Street Grid Location: G6 27th Edition

Appendix B

EXISTING STRUCTURE PHOTOGRAPHS

EXISTING STRUCTURE PHOTOGRAPHS



1. BC 8019 – North Elevation



2. BC 8019 – South Elevation

EXISTING STRUCTURE PHOTOGRAPHS



3. BC 8019 – East Approach Looking West



4. BC 8019 – West Approach Looking East

EXISTING STRUCTURE PHOTOGRAPHS



5. BC 8019 – Typical Condition of the Existing Masonry Abutments and Concrete Encased Steel Girders



6. BC 8019 – Typical Condition of the Existing Masonry Abutments and Concrete Encased Steel Girders

EXISTING STRUCTURE PHOTOGRAPHS



7. BC 8020 – North Elevation



8. BC 8020 – South Elevation

EXISTING STRUCTURE PHOTOGRAPHS



9. BC 8020 – East Approach Looking West



10. BC 8020 – West Approach Looking East

EXISTING STRUCTURE PHOTOGRAPHS



11. BC 8020 – Typical Condition of Concrete Encased Girders, West Masonry Abutment, and Opening of Adjacent Concrete Culvert BC 1255



12. BC 8020 – Typical Condition of Concrete Encased Girders and East Masonry Abutment near Adjacent Existing Concrete Culvert

EXISTING STRUCTURE PHOTOGRAPHS



13. BC 1255 – Typical Condition of Concrete Culvert Top Slab and Walls



14. BC 1255 - Typical Condition of Concrete Culvert Top Slab

EXISTING STRUCTURE PHOTOGRAPHS



15. BC 1555 – Typical Condition of Concrete Culvert Top Slab



16. BC 1555 – Spalling of Concrete at Existing Storm Drain in the West Culvert Wall

Appendix C

EXISTING BRIDGE PLANS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
AND

STATE HIGHWAY ADMINISTRATION OF MARYLAND
INTERSTATE DIVISION FOR BALTIMORE CITY

GRADING, CURBING, UTILITY & STRUCTURE ADJUSTMENTS
- RECONSTRUCTION OF CENTRAL AVENUE -
ALICEANNA ST. BRIDGE, FLEET ST. BRIDGE & HARFORD RUN STORM DRAIN

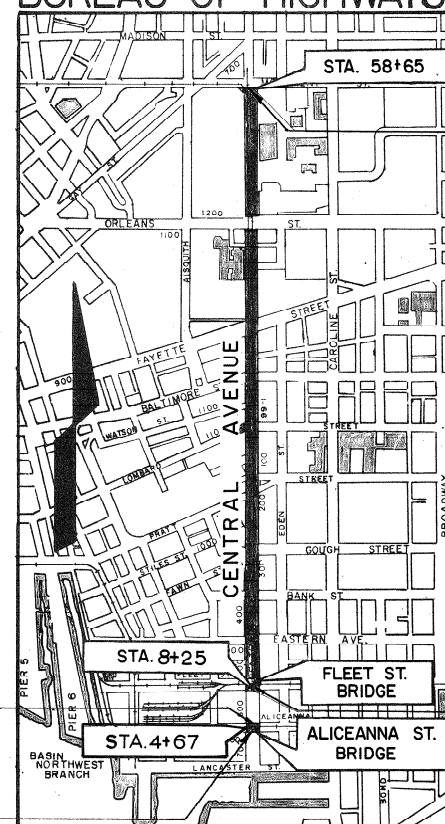
FEDERAL AID PROJECT NO. IX 3057 (2)
THE STATE HIGHWAY ADMINISTRATION PROJECT NO. B.C. 311-107-815
CITY OF BALTIMORE BUREAU OF HIGHWAYS CONTRACT NO. 3052

SOIL LEGEND

A-3 SAND	A-4-7 CLAYEY SILT
A-2 SAND & FINES	A-7-4 SILTY CLAY
A-2-4 SILTY SAND	A-7 CLAY
A-4-2 SANDY SILT	A-6 COLLOIDAL CLAY
A-2-7 CLAYEY SAND	A-5 MICA, DIATOMS, DECOMPOSED ROCK
A-7-2 SANDY CLAY	A-8 SWAMP MUCK
A-4 SILT	ROCK REFUSAL

PLAN LOCATION OF SOIL BORINGS

THE SYSTEM OF SOIL CLASSIFICATION SHALL BE IN ACCORDANCE WITH AASHTO DESIGNATION M-145, AS AMENDED TO DATE, SHOWN IN "STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING, PART I."



LIMIT OF WORK
CENTRAL AVENUE
B SURVEY STA. 58+65
F.A.P. NO. IX-3057(2)
SHA. NO. BC 311-107-815
BALTO. CITY NO. 3052

LIMIT OF WORK
CENTRAL AVENUE
B SURVEY STA. 5+02
F.A.P. NO. IX-3057(2)
SHA. NO. BC 311-107-815
BALTO. CITY NO. 3052

LIMIT OF WORK
CENTRAL AVENUE
B SURVEY STA. 4+27
F.A.P. NO. IX-3057(2)
SHA. NO. BC 311-107-815
BALTO. CITY NO. 3052

DESIGN SPEED =>50 MPH

TRAFFIC DATA		
YEAR	1985	2005
ADT	6300	10,000
DHV	600	1,000
DD	60 NB 60 SB	60 NB 60 SB
TRUCKS	20%	20%
DESIGN SPEED	CENTRAL AVE. >50 M.P.H.	
PROJECT LENGTH	0.948 MILES	

FIELD BOOKS	
Book No.	Description
PJ-1	Location & Intersecting Street Cross-Sections
PJ-2	Bench Marks & Main Line Cross-Sections
PJ-3	Main Line Cross-Sections & Intersecting Street Cross-Sections
PJ-4	Intersecting Street Cross-Sections, Location at Bridges and Elevations on Utilities using Survey Plan

NOTE: Effective July 1, 1971, in accordance with the provisions of Chapter 526 of Acts of the 1970 General Assembly, wherever the title "State Roads Commission" and/or the term "Commission" is used, it shall be construed to be the "State Highway Administration."

NOTE: The design of this project has incorporated facilities for the elderly and handicapped in compliance with State and Federal legislation.

Right-of-way lines shown on these plans do not include easement. They are for assistance in interpreting the plans. These lines do not represent the official property acquisition lines. For official fee right-of-way and easement information, see the appropriate right-of-way plat or plats.

CHECKED BY:	INITIALS	DATE
BUREAU OF WATER AND WASTEWATER		
WATER ENGINEERING DIVISION	RJK	9/23/85
WASTEWATER ENGINEERING DIVISION	NHL	9/18/85
BUREAU OF HIGHWAYS		
HIGHWAY ENGINEERING DIVISION	LKL	9/18/85
LIGHTING SECTION - HIGHWAY MAINT. DIV.	SLW	9/13/85
ENVIRONMENTAL SERVICES - CONDUIT	BDK	9/19/85
BUREAU OF CONSTRUCTION MANAGEMENT		
SURVEY AND RECORDS DIVISION	Hwy	9/17/85
UTILITIES SECTION - I.D.B.C.	W	9-12-85
DEPARTMENT OF TRANSIT AND TRAFFIC	RKS	9/20/85
SEDIMENTATION & EROSION CONTROL	TL	9/18/85

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS

APPROVAL RECOMMENDED
George P. Rudzikakis
HEAD, BUREAU OF HIGHWAYS

APPROVED
Donald W. Quist
DIRECTOR OF PUBLIC WORKS

PREPARED BY
PURDUM & JESCHKE
CONSULTING ENGINEERS
1029 N. CALVERT STREET
BALTIMORE, MARYLAND

STATE HIGHWAY ADMINISTRATION OF MARYLAND

REVIEWED AND APPROVAL RECOMMENDED
M. Joseph Shuman
CHIEF, BUREAU OF DESIGN


APPROVAL RECOMMENDED
M. Joseph Shuman
CHIEF, INTERSTATE DIVISION FOR BALTIMORE CITY

APPROVED
John E. Doherty
CHIEF ENGINEER

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

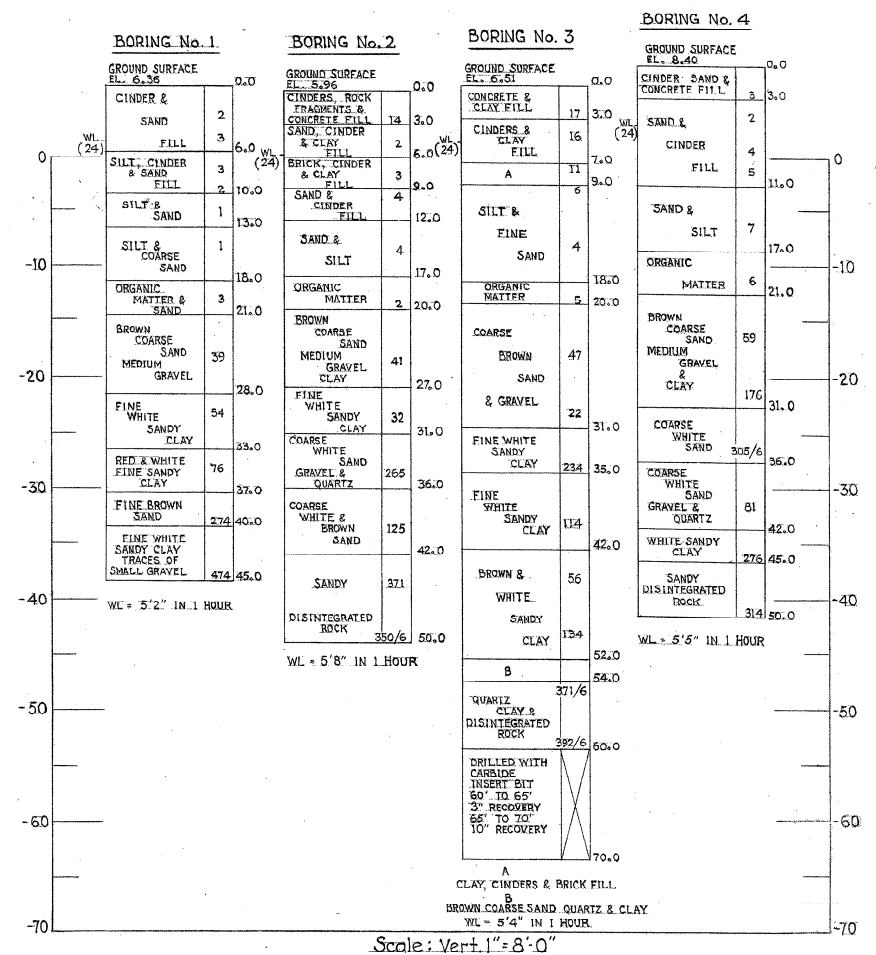
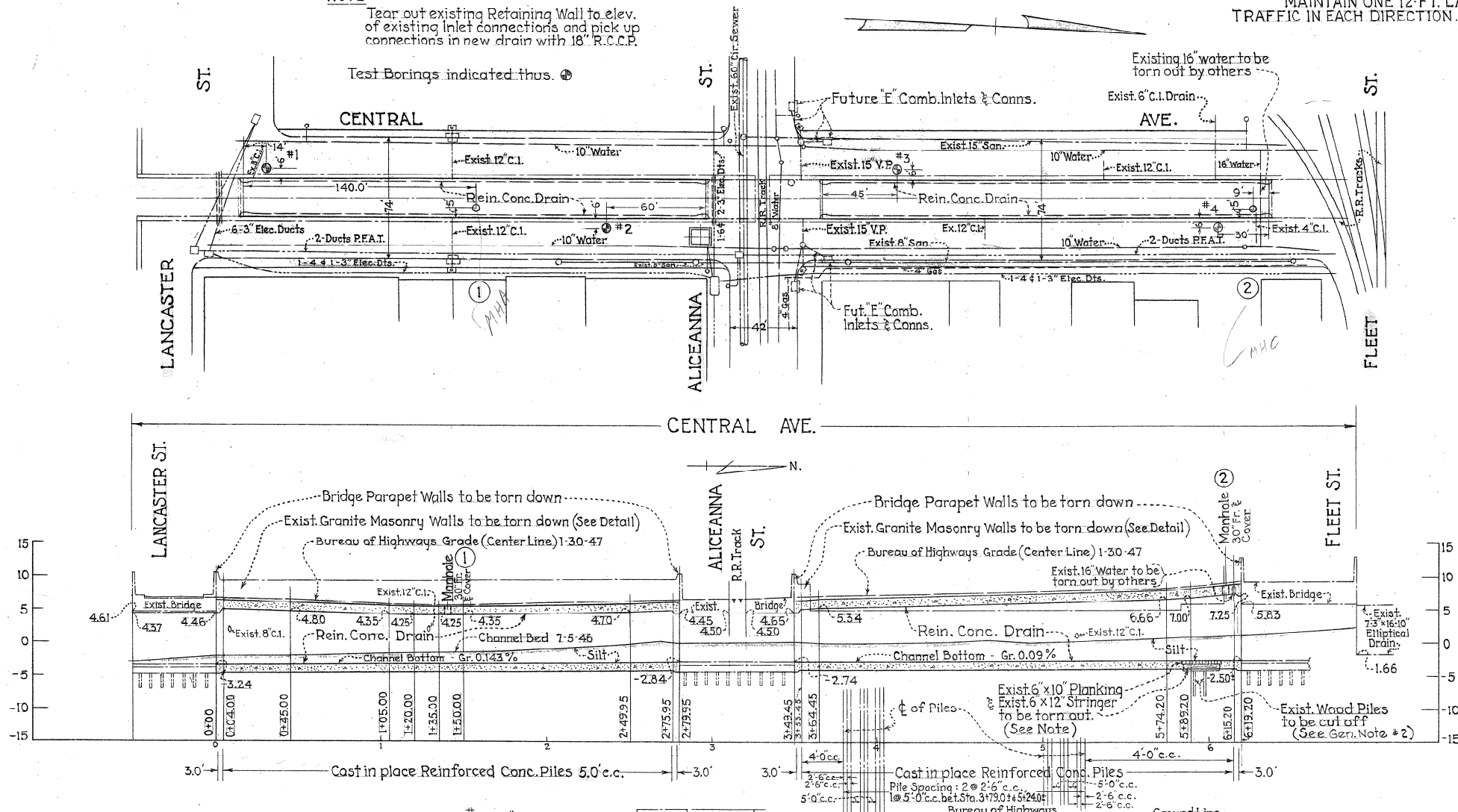
APPROVED
DIVISION ADMINISTRATOR
DATE

FHWA REGION	STATE	FED AID PROJECT NO	SHEET NO	TOTAL SHEETS
3	MD	1x 3057 (2)	1.1	$\frac{1.95}{196}$

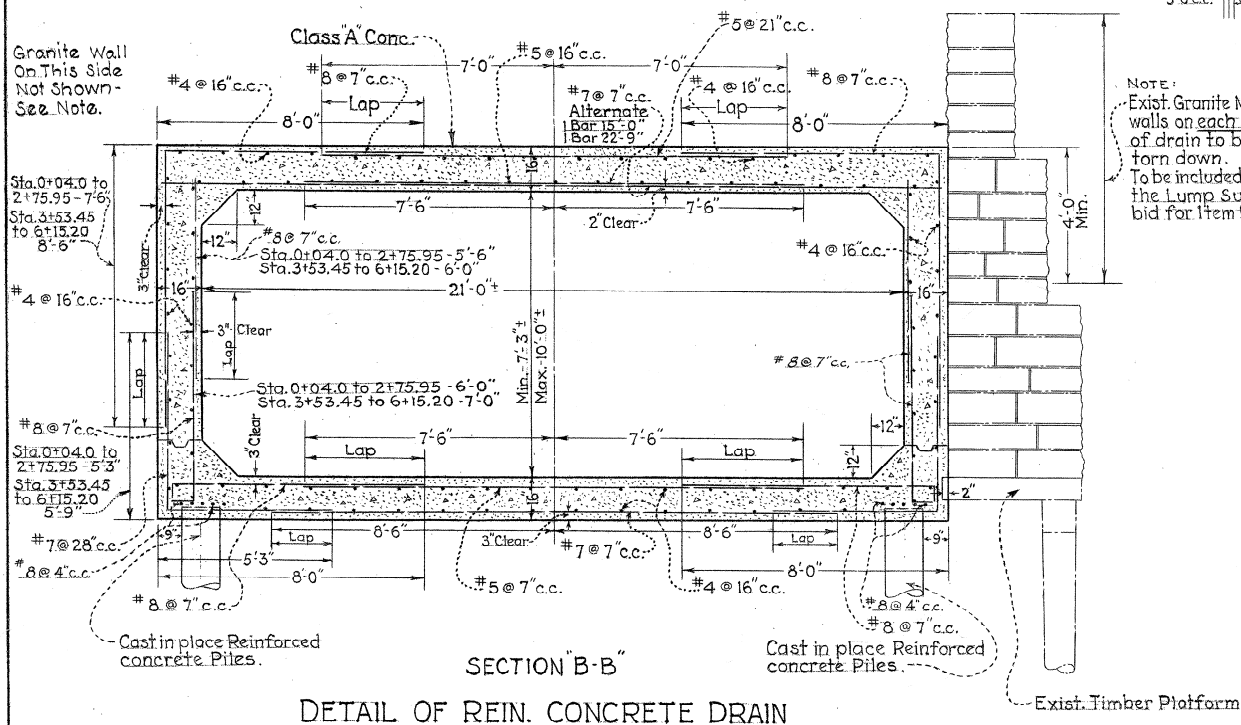
	REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS & STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY	
		 Purdum & Jeschke 1028 N. Calvert Street Baltimore, Md. 21202 CIVIL ENGINEERS	DRAWN BY _____ DES. BY _____ TRACED BY _____ CHK. BY _____ INDEX OF SHEETS F.A.P. NO. <u>IX 3057 (2)</u> S.H.A. NO. <u>BC 311-107-815</u> BALTO. CITY NO. <u>3052</u>	SHEET NO. <u>125</u> <u>1.1</u> OF <u>196</u>
			SCALE: <u>No Scale</u> DATE: <u>12/23/85</u>	

NOTE:
Tear out existing Retaining Wall to elev.
of existing Inlet connections and pick up
connections in new drain with 18" R.C.C.P.

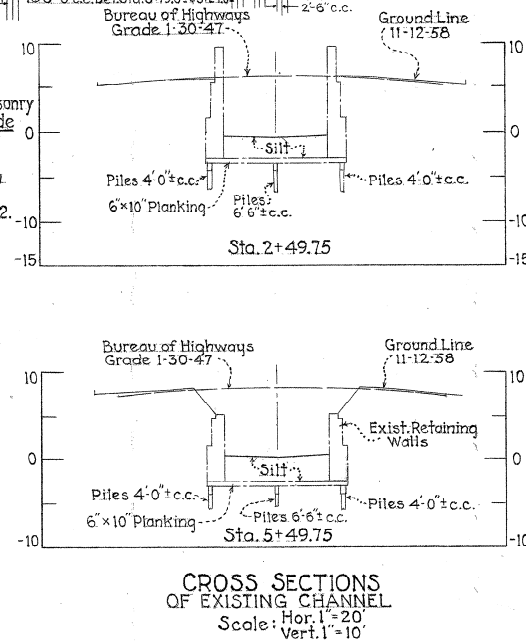
TRAFFIC NOTE:
MAINTAIN ONE 12-FT. LANE FOR
TRAFFIC IN EACH DIRECTION.



Classifications are made by visual inspection.
Water levels (WL). Figure indicates time of reading (hours) after completion of boring.
Figures in right hand column indicate number of blows required to drive 2' O.D.
sampling pipe one foot, using 140 lb. weight falling 30 inches.



SECTION "B-B"
DETAIL OF REIN. CONCRETE DRAIN
Scale: $\frac{3}{8}$ " = 1'-0"



CROSS SECTIONS
OF EXISTING CHANNEL
Scale: Hor. 1" = 20'
Vert. 1" = 10'

GENERAL NOTES:

- Where piles are to be driven, 24 inch openings shall be cut in the existing timber platform.
- The existing timber piles in the center of the channel shall be cut down to an elevation which is at least 3 inches below the elevation of the outside bottom of the new drain. Cost shall be included in the unit price bid for Item No. 1.
- No more of the existing timber platform shall be removed at any one time than the length necessary to permit the construction which will immediately follow such removal.
- Special care shall be exercised within 25 ft. of the existing bridge so as not to affect the stability of the existing channel walls under these bridges.
- Silt shall be removed from bottom of existing channel under bridges at Lancaster St. and Aliceanna St. Cost shall be included in unit price bid for Item No. 1.

NOTE: Obstructions are shown on this drawing for the convenience of the Contractor only, and the City does not warrant or guarantee the correctness or the completeness of the information given. The Contractor must verify all such information to his own satisfaction.

REVIEWED BY OFFICE ENG. *John H. P...*
SENIOR CIVIL ENGINEER
REVIEWED BY DIV. CONTRACT CONST. *T. B...*
GEN. SUPT. OF SEWERS

SERIAL NUMBERS OF MANHOLES SHOWN:
1
SURVEY BOOK M-24
B.M. NO. 5448 ELEV. 6.26
RECORD PLATS 41-M-41-K
DRAINAGE DISTRICT 21-B
FILE NO. OF DRAWINGS IN CONTRACT
B.S.80-37930
B.S.80-37931
SEE SPEC. BOOK FOR STD. DETAILS GRADES ESTABLISHED.
James P. Hunt
ENGINEER OF SURVEYS
EXAMINED BY:
J. B. Brown
SENIOR CIVIL ENGINEER

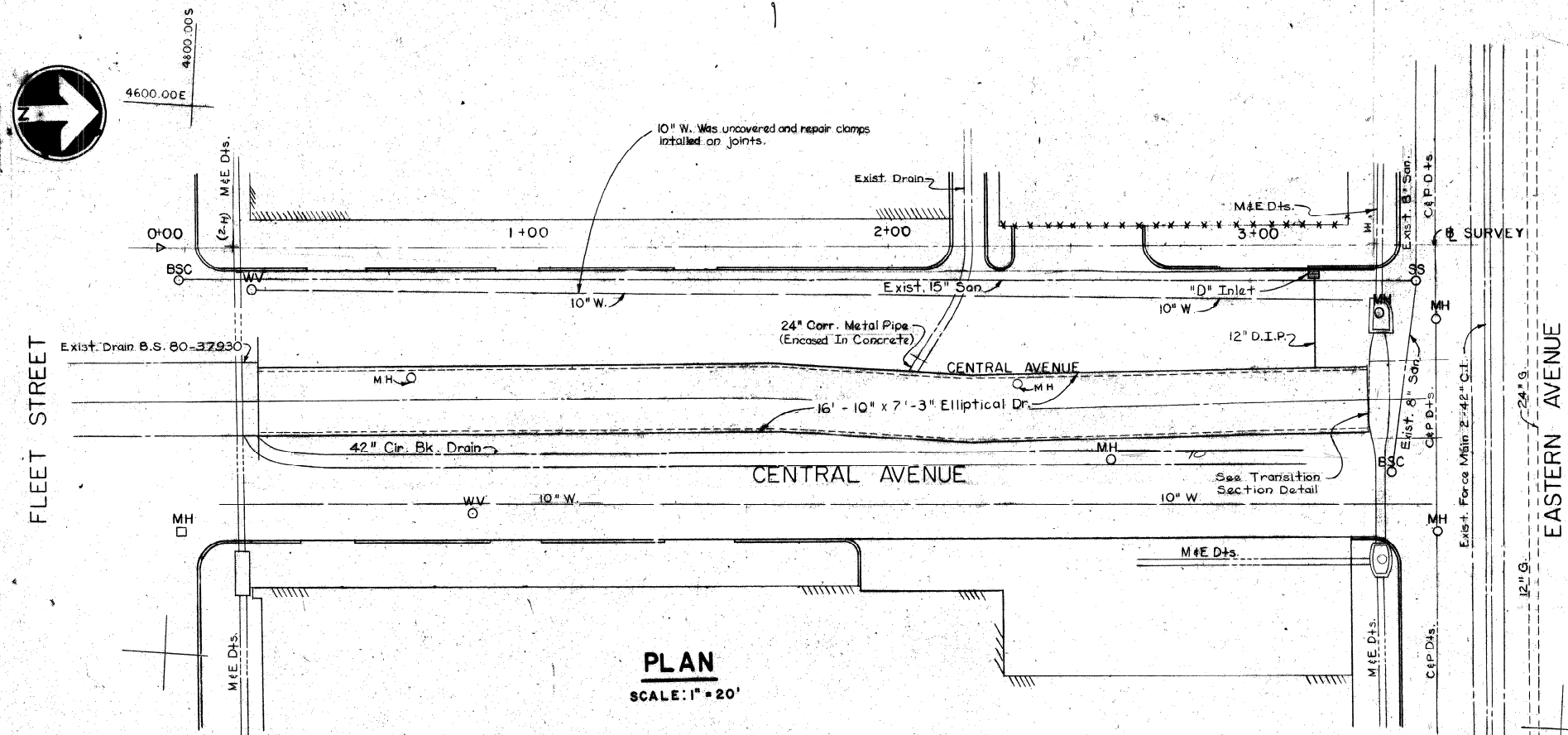
RELEASED BY R. OF W. DIVISION 4-19-59 C.W.O. 6466
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SEWERS
STORM WATER CONTRACT NO. 388
LOCATION: CENTRAL AVE. FROM FLEET ST.
TO LANCASTER ST.
SCALE: HOR. 1" = 40' VERT. 1" = 10'
OR AS SHOWN ON DRAWING
SHEETS IN SET 2
DATE APRIL 15, 1959
SHEET NO. 1
John P. Hunt
SENIOR CIVIL ENGINEER
John P. Hunt
DIRECTOR OF PUBLIC WORKS

EST. BOOK E
DESIGN BY *J.L.K.*
TRACED BY *J.L. Roscoe*
CHECKED BY *J.L.K.*
REVISED *4/15/59* Pile Spacing, Steel added in top slab.

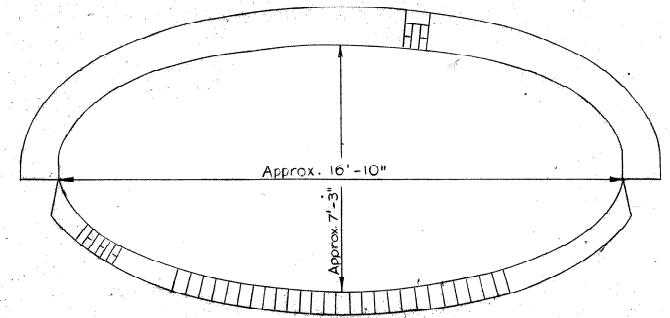
BELL TELEPHONE SYSTEM
UNDERGROUND CABLES IN THIS AREA
BEFORE STARTING WORK
Call Collect At Any Time
LE 9-9900 EXTENSION 649
For Telephone Company Representative

CONTRACTOR - Please notify Baltimore Gas & Electric Co. LE 9-8000, Ext. 691 at least three days before starting work shown on this drawing.

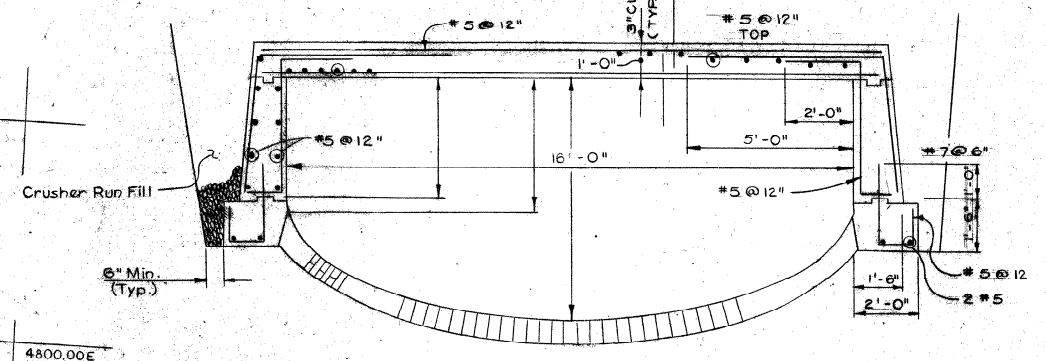
REVISIONS		
NO.	DESCRIPTION	DATE BY



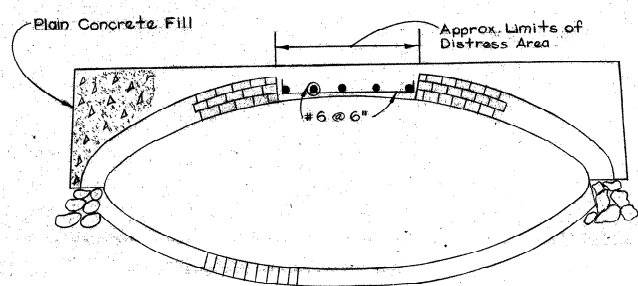
PLAN
SCALE: 1" = 20'



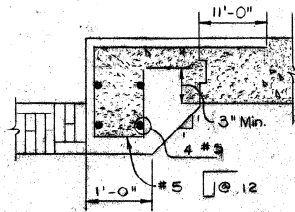
ORIGINAL SECTION



TYPICAL SECTION

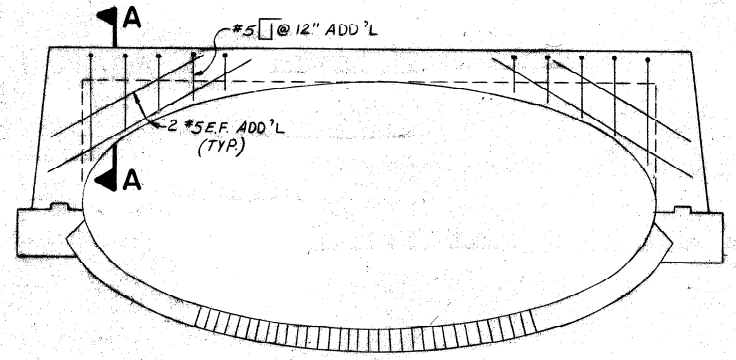


TRANSITION SECTION
At Eastern Ave. Duct (LOOKING NORTH)

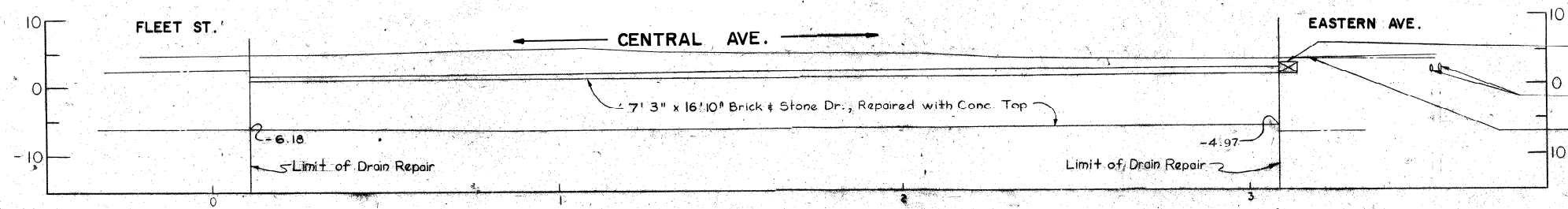


SECTION A - A

Note:
Repair performed on emergency time-and-materials contract by Baltimore Contractors Inc., July - October 1961. Also see drawing No. B.S. 80-2851.



END SECTION, FLEET STREET



- DUCT PROTRUDING THROUGH DRAIN (APPROXIMATE LOCATION)
- GAS LINES PROTRUDING THROUGH DRAIN (APPROX. LOCATION)
- PATCHED TOP OF EXIST. DRAIN VARIOUS LOCATION

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTE WATER

CENTRAL AVENUE STORM DRAIN, EMERGENCY REPAIRS
FLEET ST. AND EASTERN AVE.

SCALE AS NOTED DATE: 2/23/82
WASTE WATER ENGINEERING DIVISION SHEET 1 OF 3

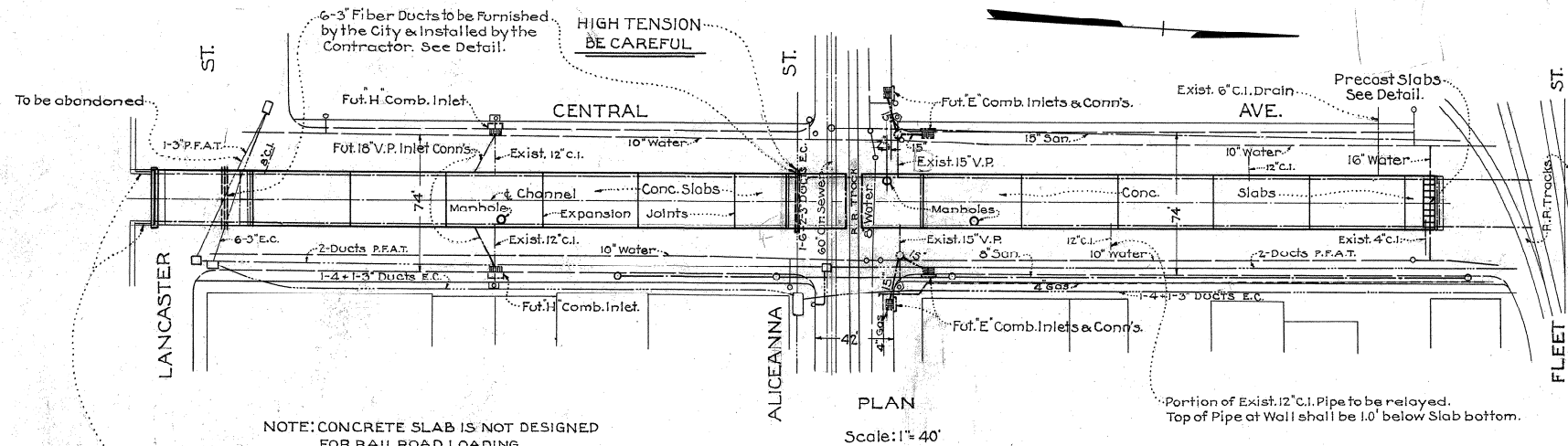
DRAWN BY *[Signature]*
CHECKED BY *[Signature]*

W.D. 3-13-47
W.D. 3-12-47

B.S. 80-34409

W.O. 2932

Released by R.O.F.W. Div. 3-7-47

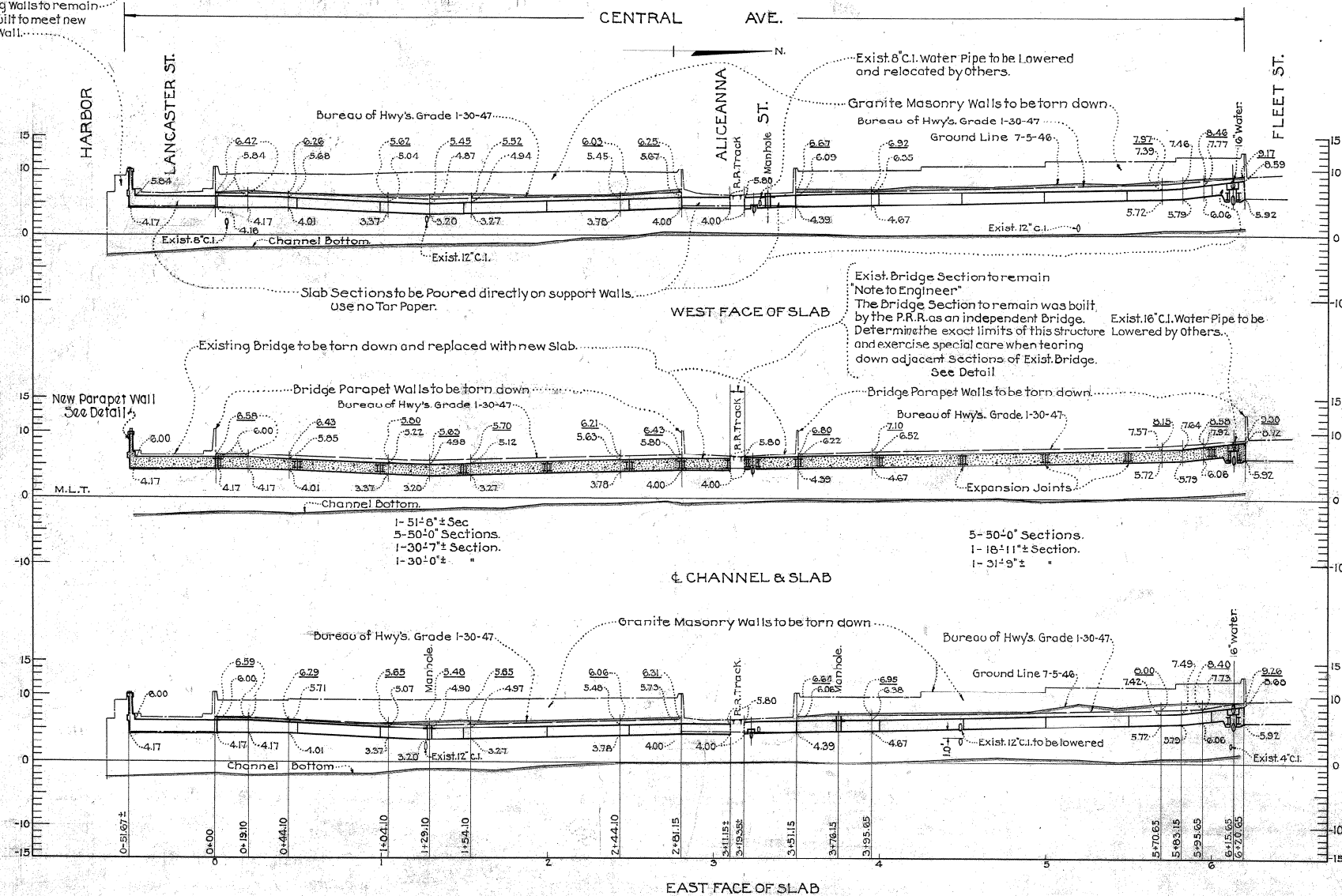


NOTE: CONCRETE SLAB IS NOT DESIGNED FOR RAILROAD LOADING.

NOTE: No Inlets or Inlet Connections to be built on this Contract.

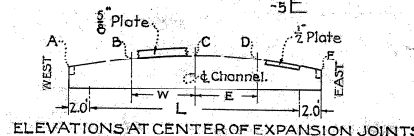
Est. Grade Elevations Shown thus: 8.00

Exist. Wing Walls to remain or be rebuilt to meet new Parapet Wall.



EAST FACE OF SLAB

Scale: HOR. 1\"/>



CROSS SECTIONS
Scale: HOR. 1\"/>

FILE NUMBERS OF DRAWINGS
IN THIS CONTRACT.
B.S. 80-34409
B.S. 80-34410
B.S. 80-34444

NOT BUILT SEE B.S. 80-37930

STORM WATER CONTRACT NO. 222
CENTRAL AVE. CHANNEL COVERING

SHEETS IN SET: 3
SCALES AS SHOWN.
ASSOCIATE ENGINEER
DEPUTY SEWERAGE ENGINEER

SHEET NO. 1
DATE: MARCH 3, 1947
SEWERAGE ENGINEER
CHIEF ENGINEER

Sheet No. 3 to B.S. 80-3444

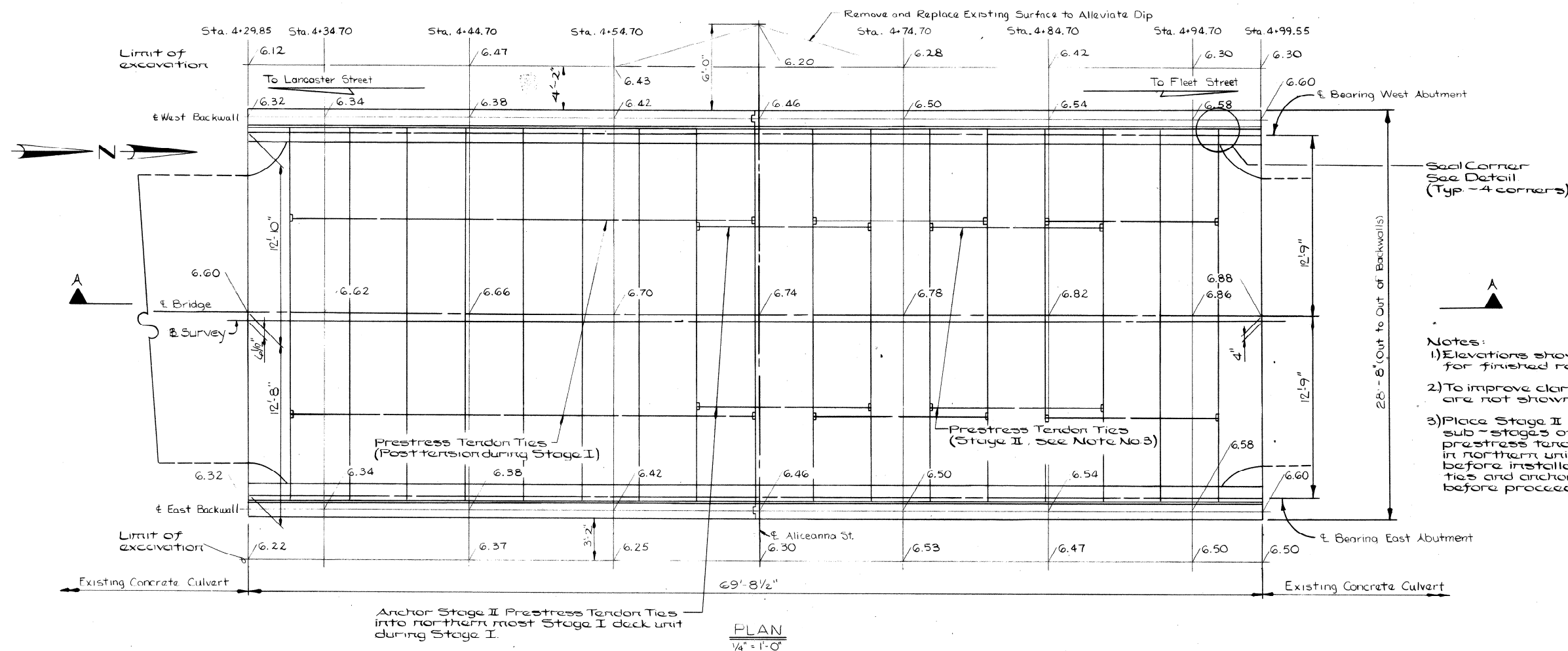
B.S. 80-34409

DRAWN BY: W.H.S.
TRACED BY: J.E.S.
CHECKED BY: K.H.S.

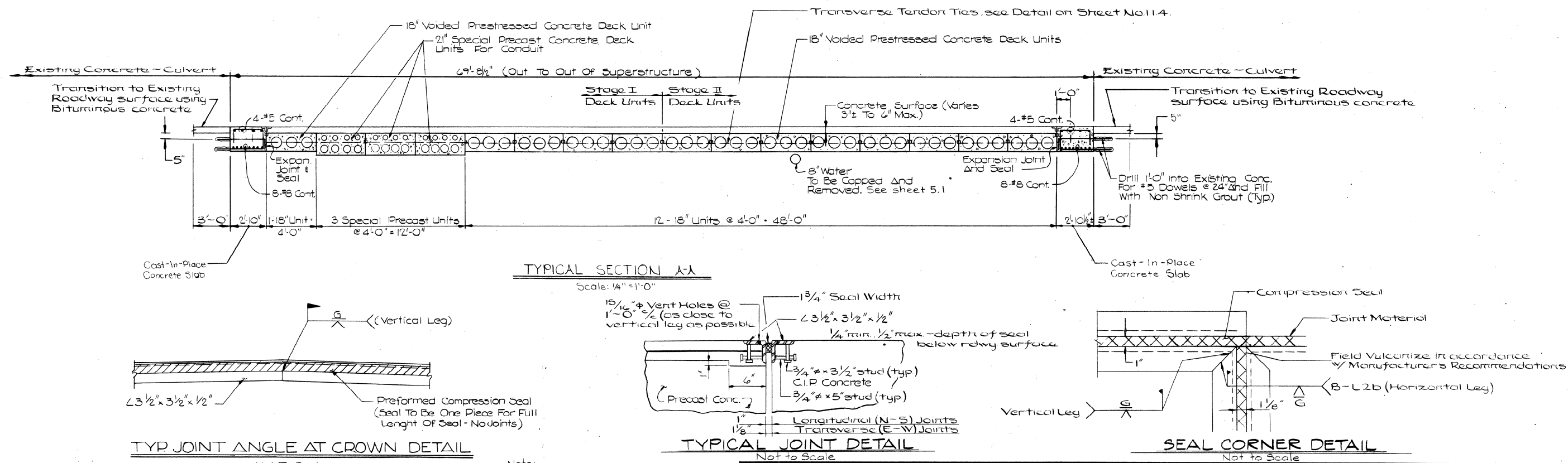
EXAMINED BY: B.P. Sunell
JR. ASSOCIATE ENGINEER

EST. GRADE: Edward J. Hadden
CITY SURVEYOR

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	MD.	IX 3057(2)	113	115 196



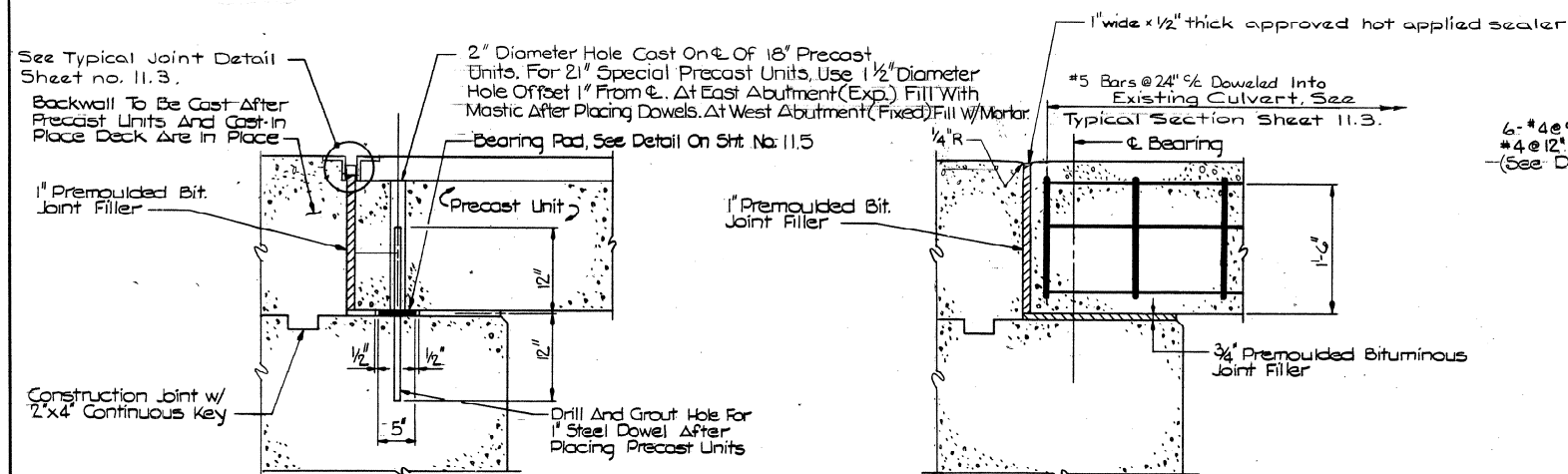
- Notes:
- 1) Elevations shown are top of grade for finished roadway.
 - 2) To improve clarity, abutment footings are not shown.
 - 3) Place Stage II deck units in four sub-stages of 2 units each. Anchor prestress tendon tie for next sub-stage in northern unit of prior sub-stage before installation of same. Post-tension ties and anchor bolts for each sub-stage before proceeding to subsequent sub-stage.



TYP JOINT ANGLE AT CROWN DETAIL
Not To Scale

Note:
Splice of joint angles at interface between Stage I and Stage II construction shall be in accordance with SHA Division of Bridge Development Standard No. BR-SS(703)-80-113.

REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS	STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY
	Purdum & Jeschke Civil Engineers 1029 N. Calvert Street Baltimore, Md. 21202	RECONSTRUCTION OF CENTRAL AVENUE BRIDGE ON ALICEANNA STREET FRAMING PLAN AND TYPICAL SECTION SCALE: AS SHOWN	DRAWN BY: L.M.W. TRACED BY: F.A.P. No IX 3057(2) S.H.A. No. BC 311-107-815 BALTO. CITY NO. 3052 DES. BY: T.S.R. CHK. BY: M.S.A. SHEET NO. 11.5 OF 196

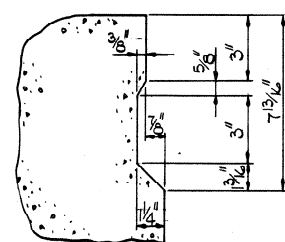


PRECAST UNITS

CAST-IN-PLACE SLAB

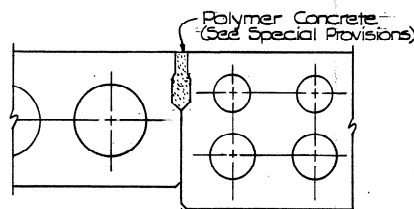
BEARING AND ANCHORAGE DETAIL

Scale: 1" = 1'-0"



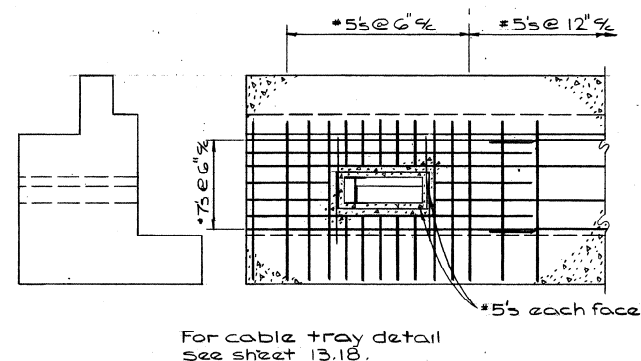
KEYWAY DETAIL

Scale: 3" = 1'-0"



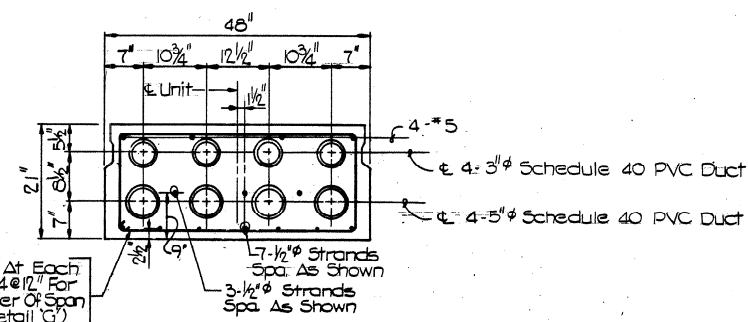
GROUTING DETAIL

Scale: 1" = 1'-0"



OPENING FOR EXISTING ME CABLES

Not To Scale



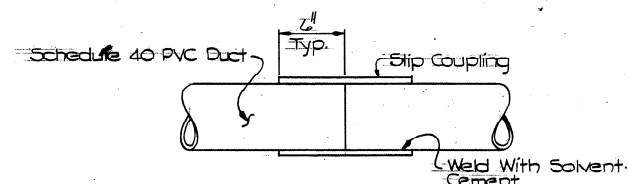
TYPICAL 18" PRESTRESSED CONCRETE UNIT

Scale: 3/4" = 1'-0"

SPECIAL 21" PRECAST CONCRETE UNIT

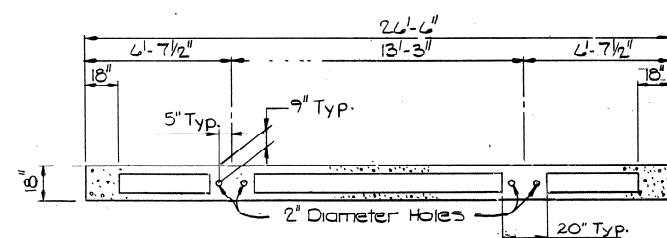
Scale: 3/4" = 1'-0"

NOTE: For additional details of ME conduit crossing at bridge backwalls, see conduit detail sheet 5.084



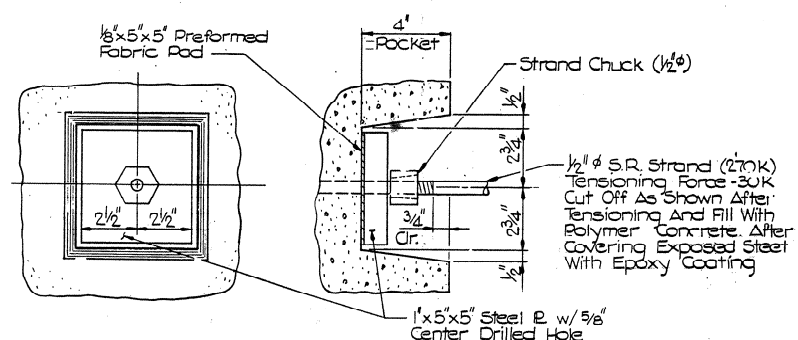
CONDUIT SPLICE DETAIL IN BEAMS

Not To Scale



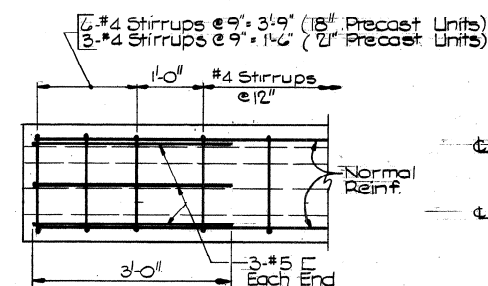
TYPICAL LONGITUDINAL SECTION

Not To Scale



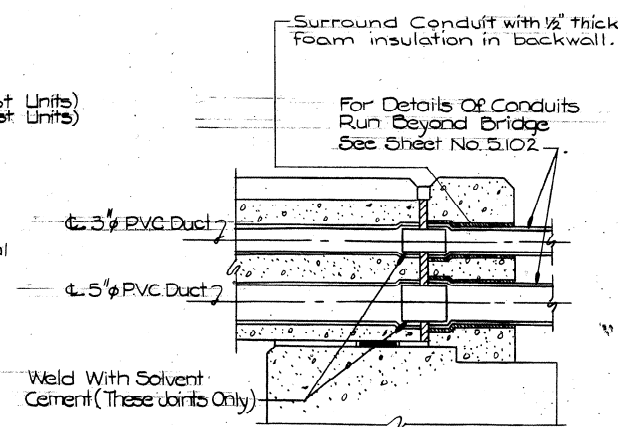
TRANSVERSE TIE DETAILS

Scale: 3" = 1'-0"



DETAIL G

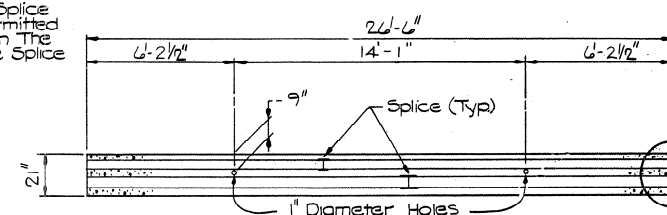
Scale: 3/4" = 1'-0"



TYP. CONDUIT CONNECTION DETAIL AT BACKWALL

Not To Scale

NOTE: Only One Splice Will Be Permitted Per Duct In The Beam. See Splice Detail



SPECIAL LONGITUDINAL SECTION FOR CONDUITS

Not To Scale

BELL COUPLING REQ'D EACH END OF BEAM

REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS		STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY	
	Purdum & Jeschke Civil Engineers 1029 N. Calvert Street Baltimore, Md. 21202	RECONSTRUCTION OF CENTRAL AVENUE BRIDGE ON ALICEANNA STREET SUPERSTRUCTURE DETAILS		DRAWN BY L.M.W. TRACED BY F.A.P. No. IX 3057(2) S.H.A. No. BC 311-107-815 BALTO. CITY No. 3052	DES. BY T.S.R. CHK. BY M.S.A. SHEET NO. 11.5 11.4 OF 196
SCALE: AS SHOWN		DATE: 12/23/85			

Scale: $\frac{1}{4}'' = 1'-0''$

Scale: $\frac{1}{4}'' = 1'-0''$

Scale: $\frac{1}{4}'' = 1'-0''$

Scale: $\frac{1}{4}'' = 10''$

Scale: $3/4" = 1'-0"$


Scale: $3/8" = 1'-0"$

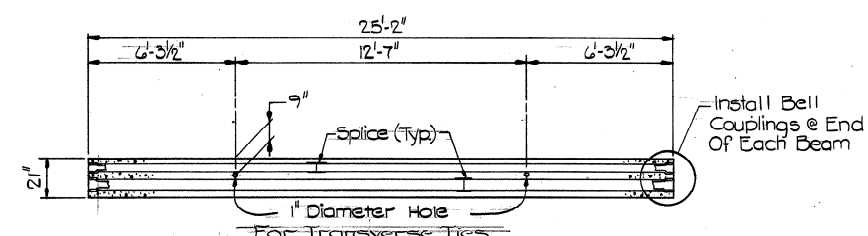
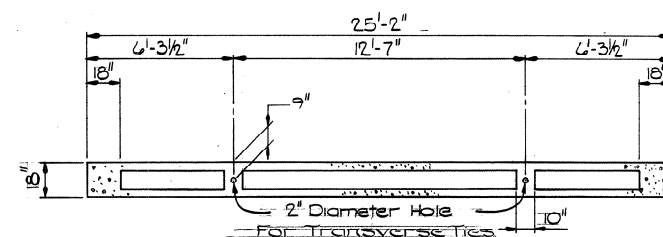
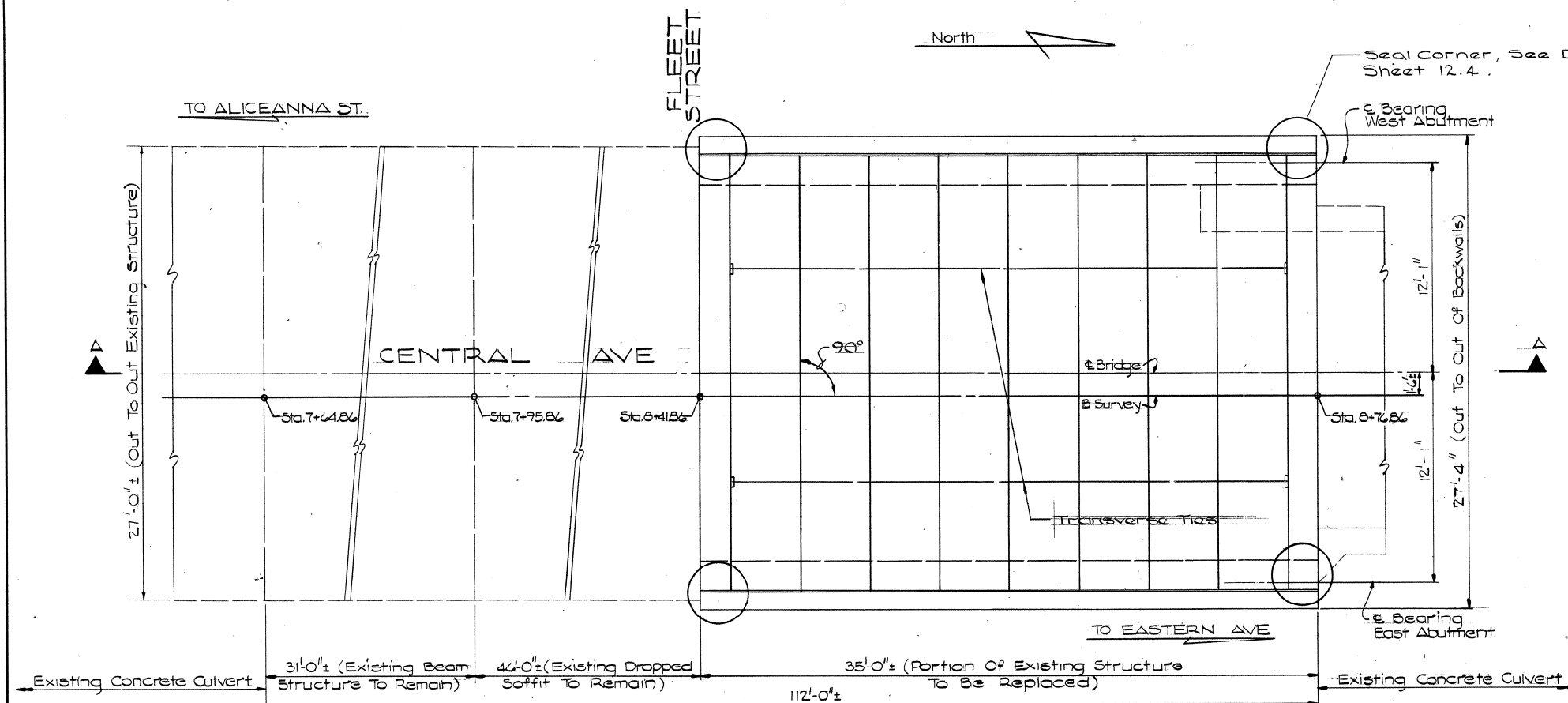
$$Scale: 3/4" = 1'$$

Scale: $3\frac{1}{4}" = 1'$

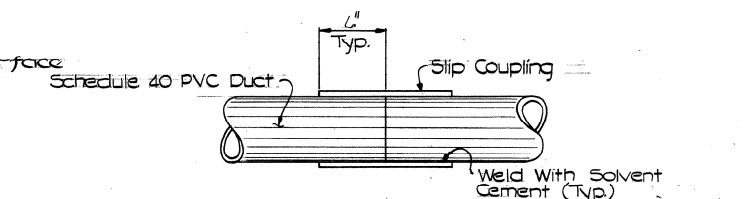
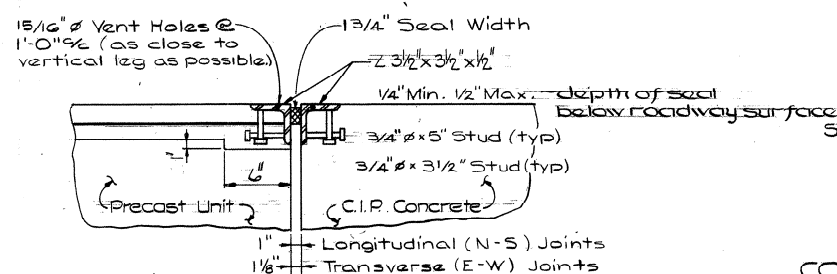
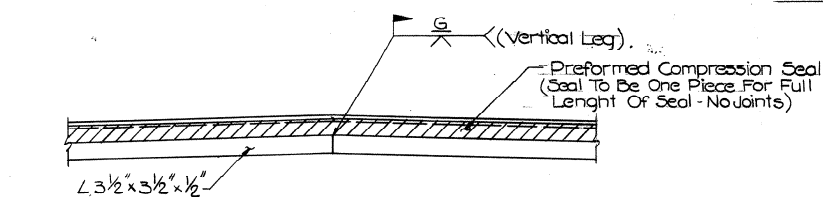
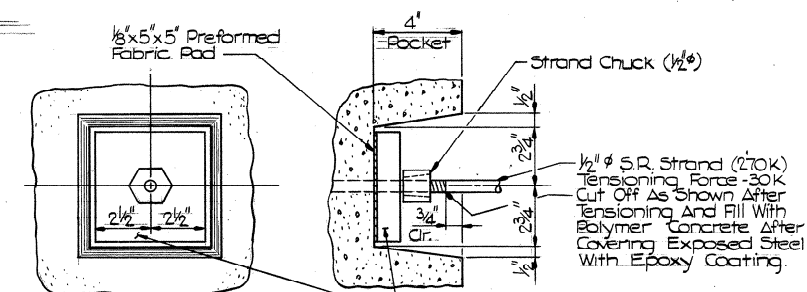
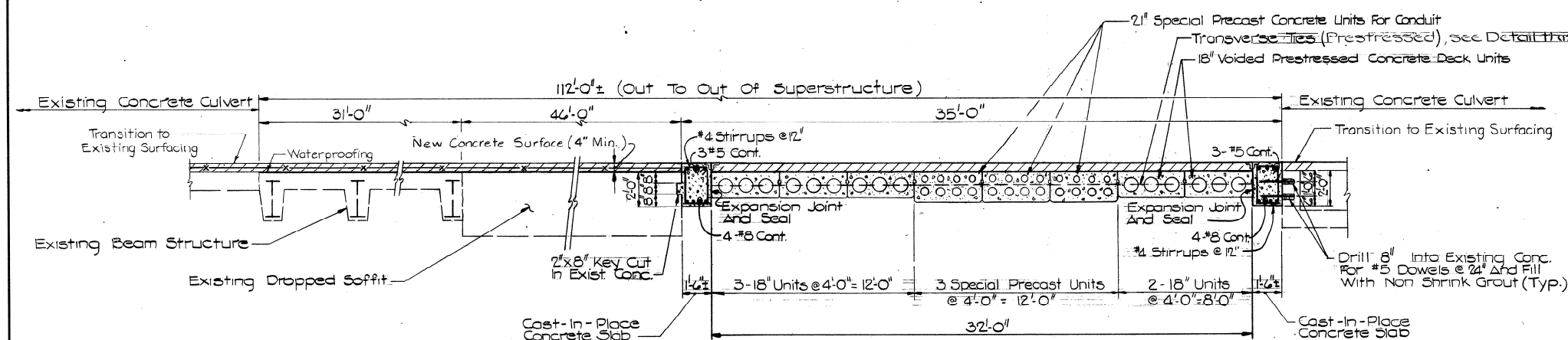
Scale: $3/8" = 1'-0"$


Scale: $3/8" = 1'$

REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS		STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY	
	 Purdum & Jeschke Civil Engineers	RECONSTRUCTION OF CENTRAL AVENUE BRIDGE ON ALICEANNA STREET ABUTMENTS		DRAWN BY <u>L.M.W.</u> TRACED BY _____	DES. BY <u>TSR</u> CHK. BY <u>M.S.A.</u>
	1020 N. Calvert Street Baltimore, Md. 21202	SCALE: AS SHOWN		DATE: <u>12/23/85</u>	F.A.P. NO. <u>IX-3057 (2)</u> S.H.A. NO. <u>BC 311-107-815</u> BALTO. CITY NO. <u>3052</u>
					SHEET NO. <u>115</u> <u>115</u> OF <u>196</u>

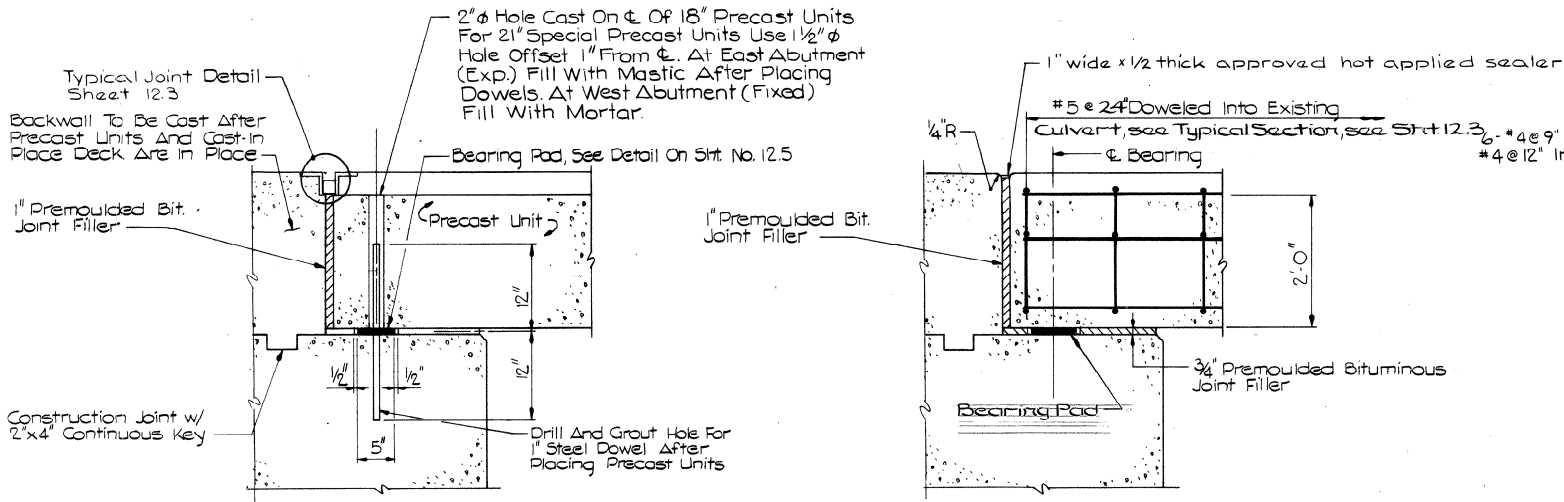


SPECIAL LONGITUDINAL SECTION FOR CONDUITS

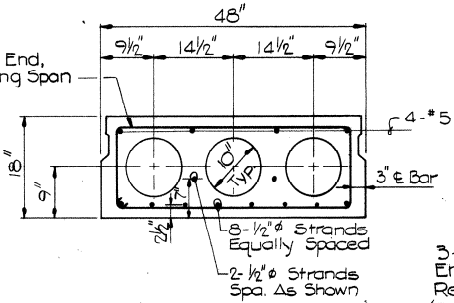


<div> <div>REVISIONS</div> <div>CONSULTANT</div> </div>	<div>  <div> <div>Purdum & Jeschke</div> <div> <div>Civil Engineers</div> <div>1020 N. Calvert Street Baltimore, Md. 21202</div> </div> </div> </div>	<div> <div> <div>CITY OF BALTIMORE</div> <div>DEPARTMENT OF PUBLIC WORKS</div> </div> <div> <div>STATE HIGHWAY ADMINISTRATION OF MARYLAND</div> <div>INTERSTATE DIVISION FOR BALTIMORE CITY</div> </div> </div> <div> <div> <div>RECONSTRUCTION OF CENTRAL AVENUE</div> <div>BRIDGE ON FLEET ST.</div> <div>FRAMING PLAN & TYP. SECTION</div> </div> <div> <div> <div>DRAWN BY: L.M.W.</div> <div>DES. BY: T.S.R.</div> </div> <div> <div>TRACED BY: L.A.A.</div> <div>CHK. BY: M.S.A.</div> </div> </div> <div> <div> <div>F.A.P. NO. IX 3057(2)</div> <div>S.H.A. NO. BC 311-107-815</div> <div>BALTO. CITY NO. 3052</div> </div> <div> <div>SCALE: AS SHOWN</div> <div>DATE: 12/23/85</div> </div> </div></div>	<div> <div>SHEET NO.</div> <div>12.5</div> <div>12.3 of 196</div> </div>
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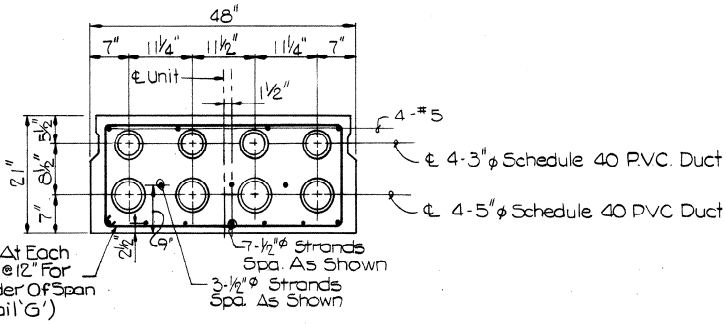
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	MD.	IX3057(2)	124	125 196



PRECAST UNITS CAST-IN-PLACE SLAB
BEARING AND ANCHORAGE DETAIL
Scale: 1"=1'-0"

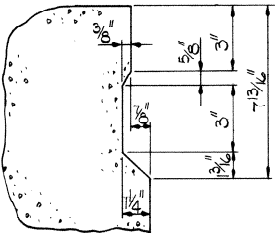


TYPICAL 18" PRESTRESSED CONCRETE UNIT
Scale: 3/4"=1'-0"



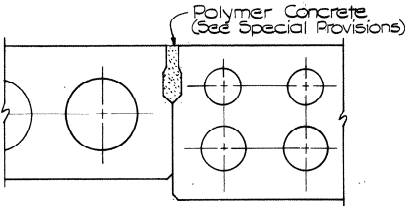
SPECIAL 21" PRECAST CONCRETE UNIT
Scale: 3/4"=1'-0"

Note: For additional details of ME conduit crossing at bridge backwall, see conduit detail sheet 5.084

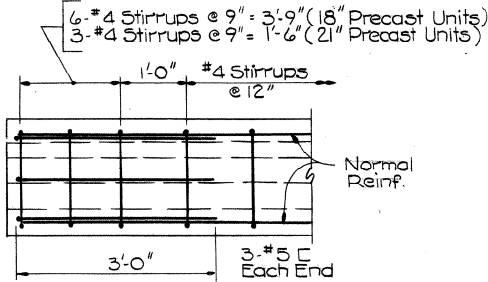


KEYWAY DETAIL
Scale: 3"=1'-0"

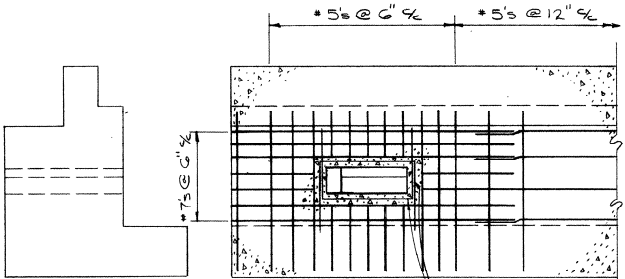
NOTE:
Omit Keyway On Exterior Of Units Adjacent To Cast-In-Place Slab.



GROUTING DETAIL
Scale: 1"=1'-0"

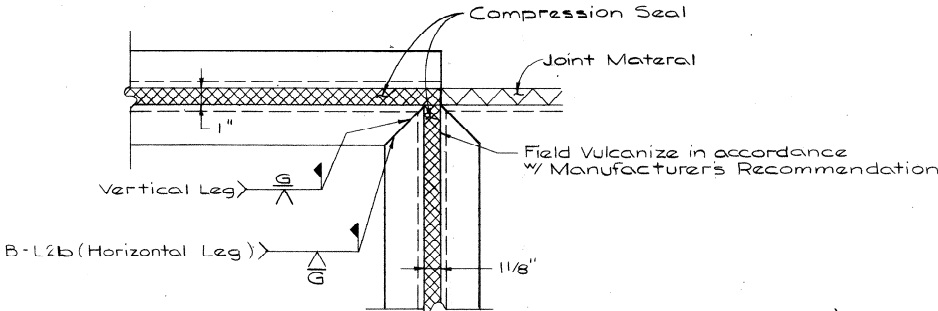


DETAIL - G
Scale: 3/4"=1'-0"



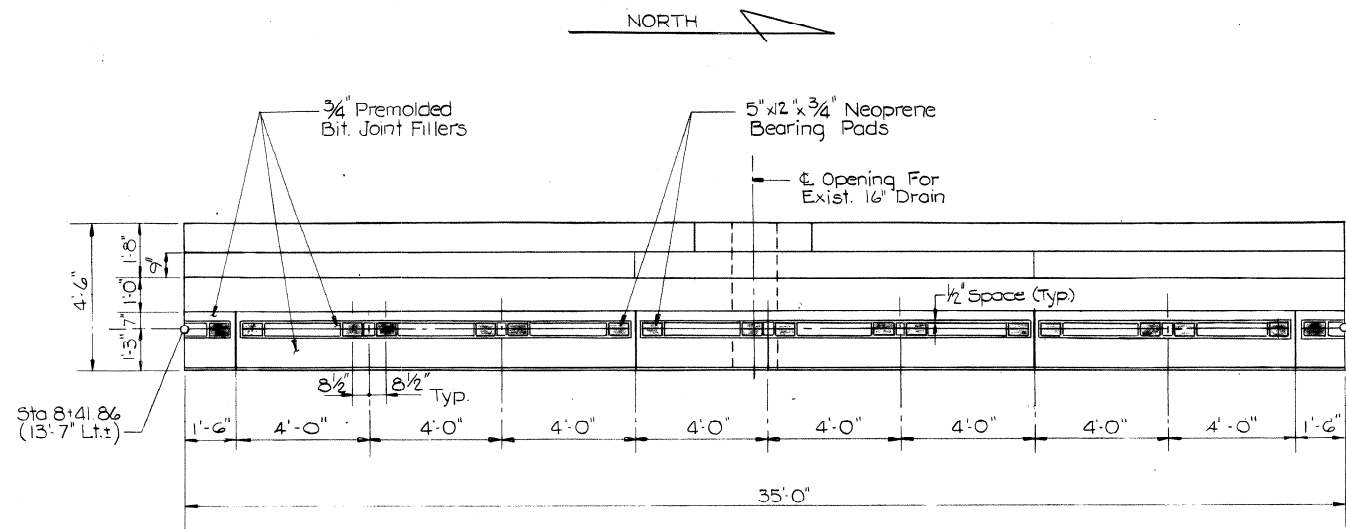
For cable tray detail see sheet 13.18.

OPENING FOR EXISTING ME CABLES
Not to Scale



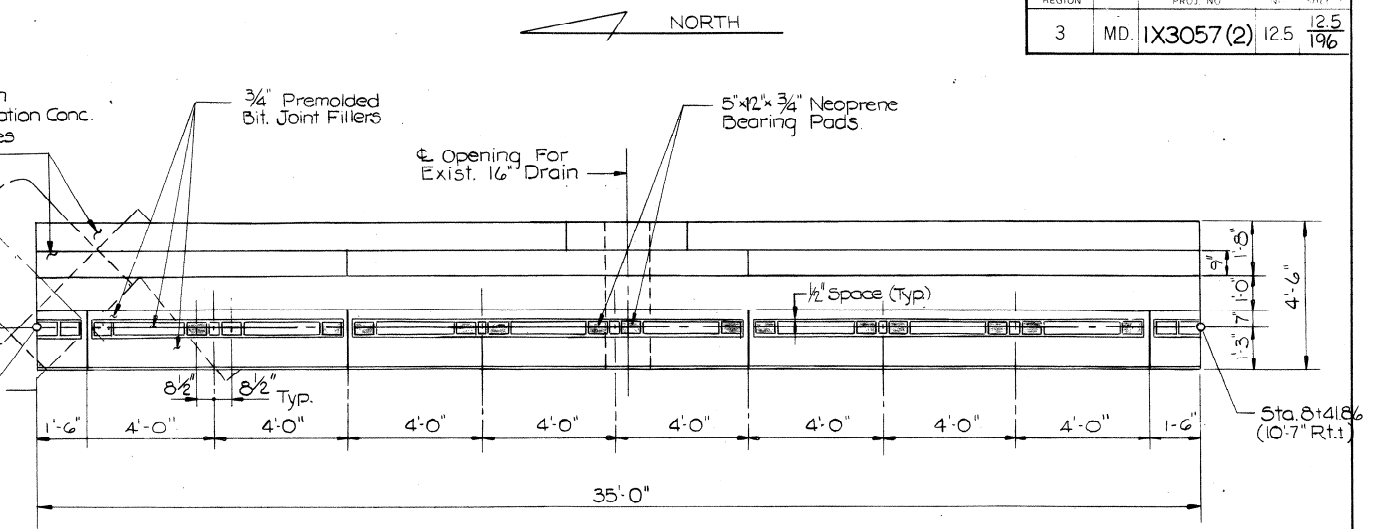
SEAL CORNER DETAIL
Not to Scale

REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS		STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY	
	Purdum & Jeschke CIVIL ENGINEERS 1029 N. Calvert Street Baltimore, Md. 21202	RECONSTRUCTION OF CENTRAL AVENUE BRIDGE ON FLEET ST. SUPERSTRUCTURE DETAILS		DRAWN BY L.M.W. TRACED BY F.A.P. NO. IX 3057(2) S.H.A. NO. BC 311-107-815 BALTO. CITY NO. 3092	DES. BY T.S.R. CHK. BY M.S.A.
SCALE: AS SHOWN		DATE: 12/23/85		SHEET NO. 125 12.4 of 196	

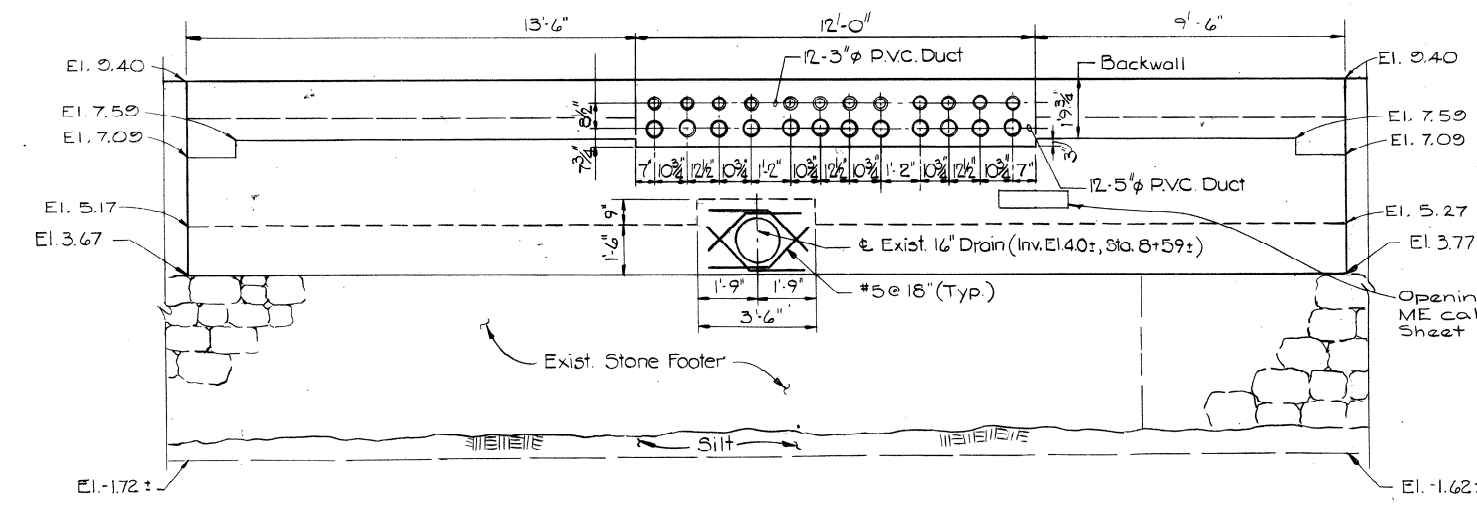


PLAN - WEST ABUTMENT
Scale: 3/8" = 1'-0"

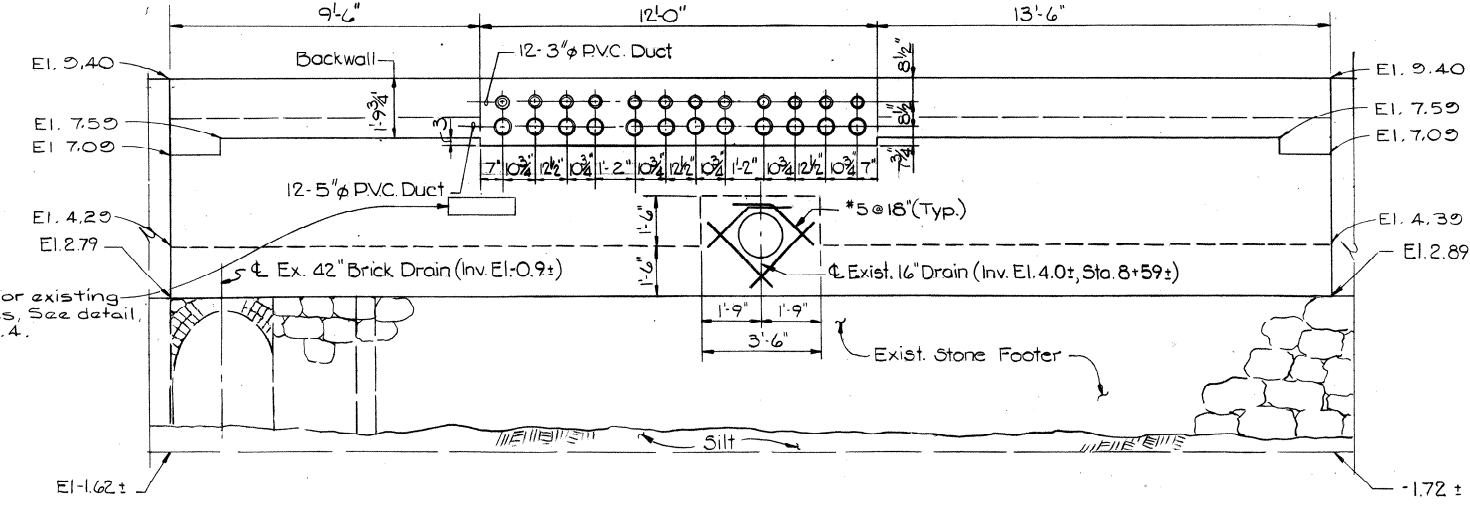
Any Voided Area Between The Underside Of Proposed Abutment And Exist. 42" Drain Is To Be Filled With Subfoundation Conc. And Must Coincide With Edges Of Proposed Abutment



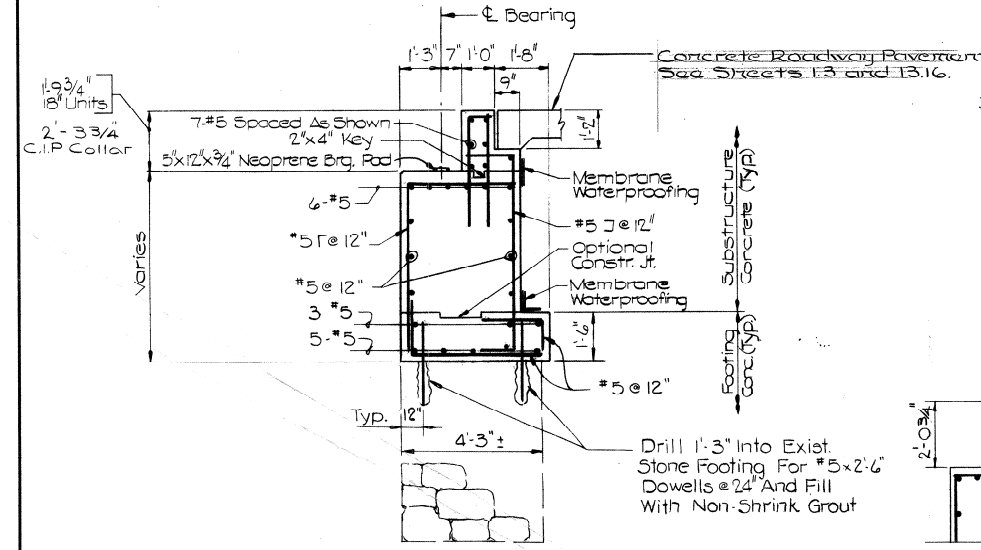
PLAN - EAST ABUTMENT
Scale: 3/8" = 1'-0"



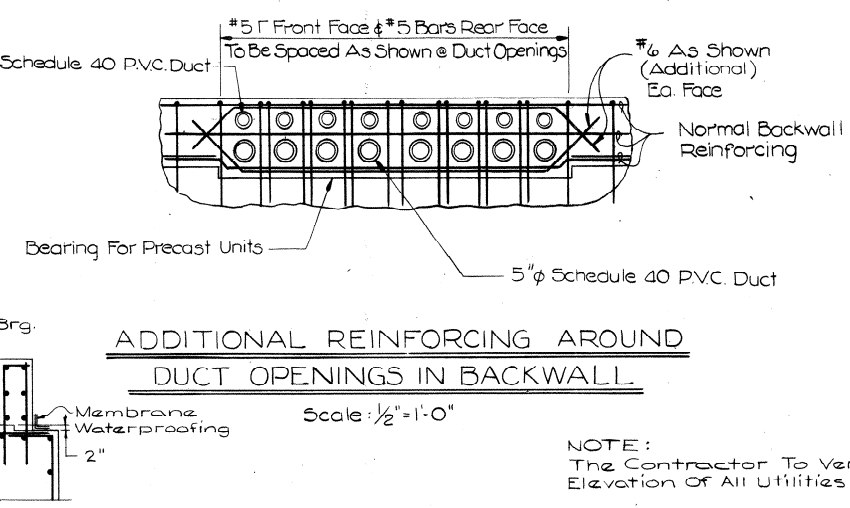
ELEVATION - WEST ABUTMENT
Scale: 3/8" = 1'-0"



ELEVATION - EAST ABUTMENT
Scale: 3/8" = 1'-0"



TYPICAL SECTION
THRU WEST AND EAST ABUTMENTS
FOR 18" UNITS AND CAST IN PLACE COLLAR
Scale: 3/8" = 1'-0"

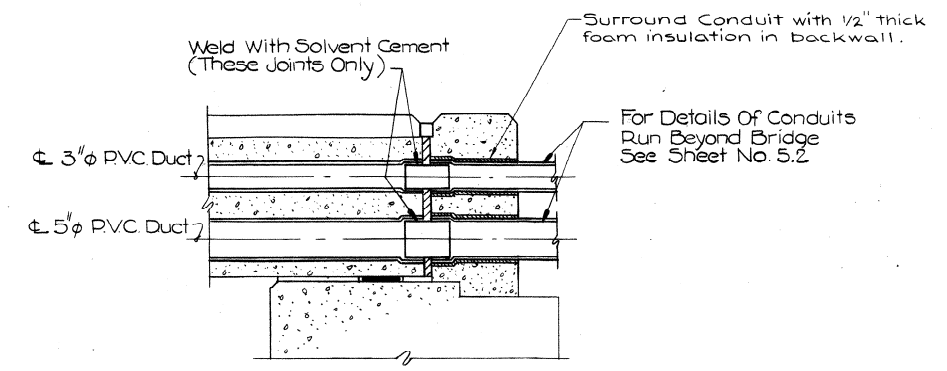


TYPICAL BACKWALL SECTION
AT 21" UNITS
For details not shown, see typical sections for 18" units
Scale: 1/2" = 1'-0"

ADDITIONAL REINFORCING AROUND
DUCT OPENINGS IN BACKWALL

Scale: 1/2" = 1'-0"

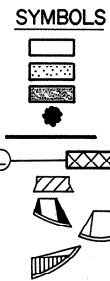
NOTE:
The Contractor To Verify The Invert
Elevation Of All Utilities In The Field.



TYP CONDUIT CONNECTION
DETAIL AT BACKWALL
Not To Scale

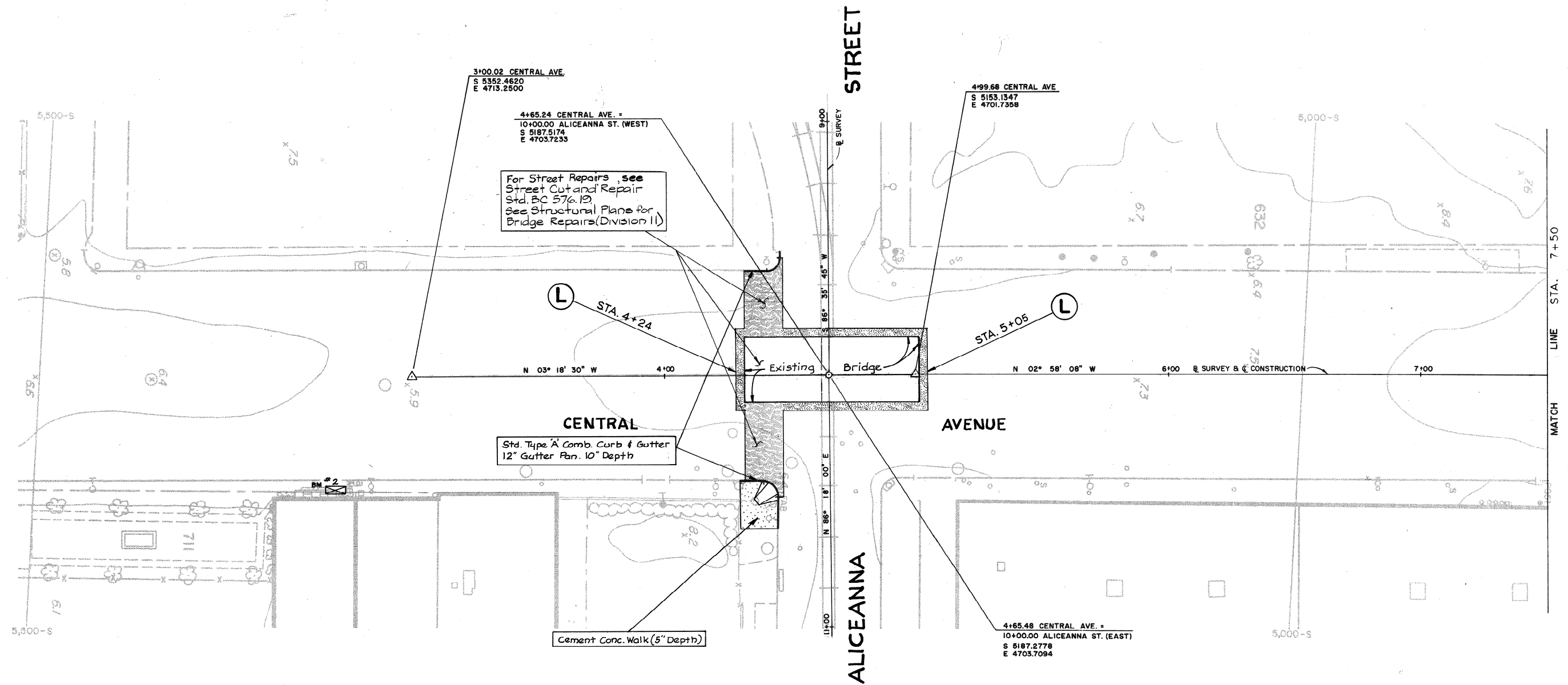
REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS	STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY
	Purdum & Jeschke Civil Engineers 1029 N. Calvert Street Baltimore, Md. 21202	RECONSTRUCTION OF CENTRAL AVENUE BRIDGE ON FLEET ST ABUTMENTS	DRAWN BY: ACR TRACED BY: S.H.A. NO. BC 311-107-815 BALTO. CITY NO. 3032
		SCALE: AS SHOWN	DATE: 12/23/85
			SHEET NO. 125 OF 196

- LEGEND**
- PROPOSED ROADWAY PLANS**
- CONCRETE PAVING
 - CONCRETE SIDEWALK
 - BITUMINOUS PAVING
 - TREE
 - COMB. CONC. CURB & GUTTER
 - LIMIT OF WORK - TAPER TIE-IN
 - DRIVEWAYS (SEE DETAIL SHEET 1.9)
 - PEDESTRIAN RAMPS - TYPE 1 (SEE BC STD. 655.20)
 - PEDESTRIAN RAMPS - TYPE 2 (SEE BC STD. 655.21)
 - PEDESTRIAN RAMPS - TYPE 3 (SEE BC STD. 655.25)



Temp Bench Mark #2
□ - Cut on top N corner
of brick planter
44 Rt @ Sta. 2+70
Elev. 2.85

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	MD.	IX 3057(2)	2.1	2192 136



REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS	STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY
	 Purdum & Jeschke Civil Engineers 1029 N. Calvert Street Baltimore, Md. 21202	RECONSTRUCTION OF CENTRAL AVENUE ROADWAY PLAN - ALICEANNA STREET BRIDGE AND STREET REPAIRS	DRAWN BY PWR TRACED BY JMJ DES. BY JCT CHK. BY CGW
		SCALE: 1" = 20'	DATE: 12/23/83
			F.A.P. NO. IX 3057(2) S.H.A. NO. BC 311-107-815 BALTO. CITY NO. 3052
			SHEET NO. 2.1 OF 136

CURB LOCATION				
POINT	DESCRIPTION	STATION	OFFSET	
1	PC	7+96.41	41.93' Rt.	
2	PT	8+16.35	62.02' Rt.	
3	PC	8+58.37	56.91' Rt.	
4	PT	8+78.37	37.00' Rt.	
5				
6				
7				
8				
9	PC	11+68.72	37.00' Lt.	
10	PC	11+70.46	37.00' Rt.	
11	PT	11+88.46	55.00' Rt.	
12	PT	11+88.72	56.98' Lt.	
13	PC	12+30.22	57.02' Lt.	
14	PC	12+32.46	57.01' Rt.	
15	PT	12+50.22	37.00' Lt.	
16	PT	12+52.46	37.00' Rt.	

Temp. Bench Mark #3
 5' Cut on brick entrance step.
 51' Lt. @ Sta. 10+30
 Elev. 9.71

Sta. 8+78.9 to 11+68.7 Lt.
 Replace Existing Sidewalks, Driveways and Alley to building line. Existing curb to remain undisturbed except at the North and South side of existing alley which will be replaced to the building line. See BC Std. 500.11

CENTRAL AVENUE

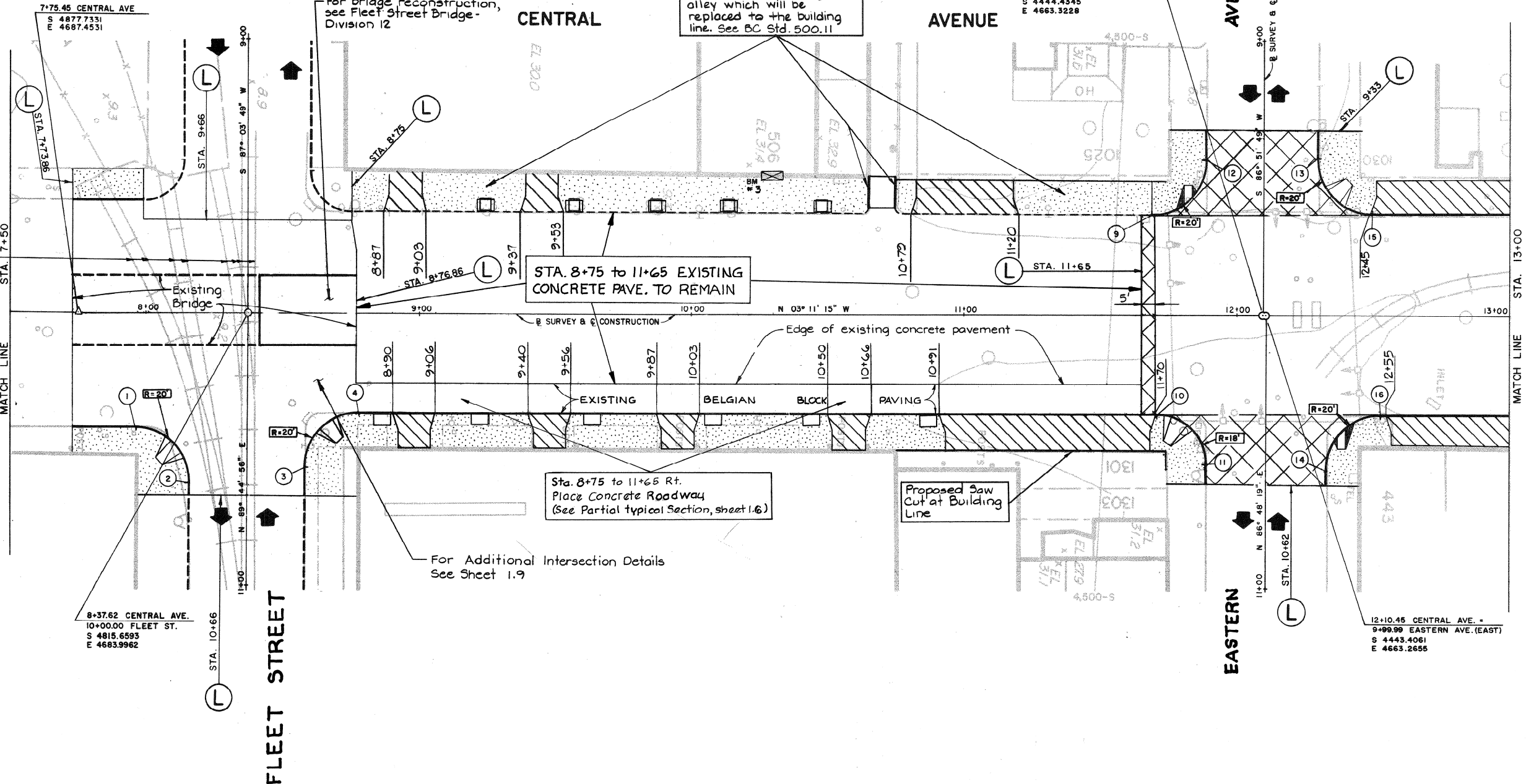
AVENUE

AVENUE

EASTERN AVENUE

JONES FALLS BOULEVARD

FLEET STREET



Remove All Tracks Within the Intersection

STA. 8+75 TO 11+65 EXISTING CONCRETE PAVE. TO REMAIN

Sta. 8+75 to 11+65 Rt. Place Concrete Roadway (See Partial typical Section, sheet 1.6)

For Additional Intersection Details See Sheet 1.9

Proposed Saw Cut at Building Line

REVISIONS	CONSULTANT	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS & STATE HIGHWAY ADMINISTRATION OF MARYLAND INTERSTATE DIVISION FOR BALTIMORE CITY	
	Purdum & Jeschke Civil Engineers 1029 N. Calvert Street Baltimore, Md. 21202	RECONSTRUCTION OF CENTRAL AVENUE ROADWAY PLAN STA. 7+73.86 TO STA. 13+00	DRAWN BY: PWR TRACED BY: JMJ F.A.P. NO. IX 3057(2) S.H.A. NO. BC 311-107-815 BALTO. CITY NO. 3052
SCALE: 1" = 20'		DATE: 12/23/85	DES. BY: JCT CHK. BY: CGW SHEET NO. 2.2 of 106

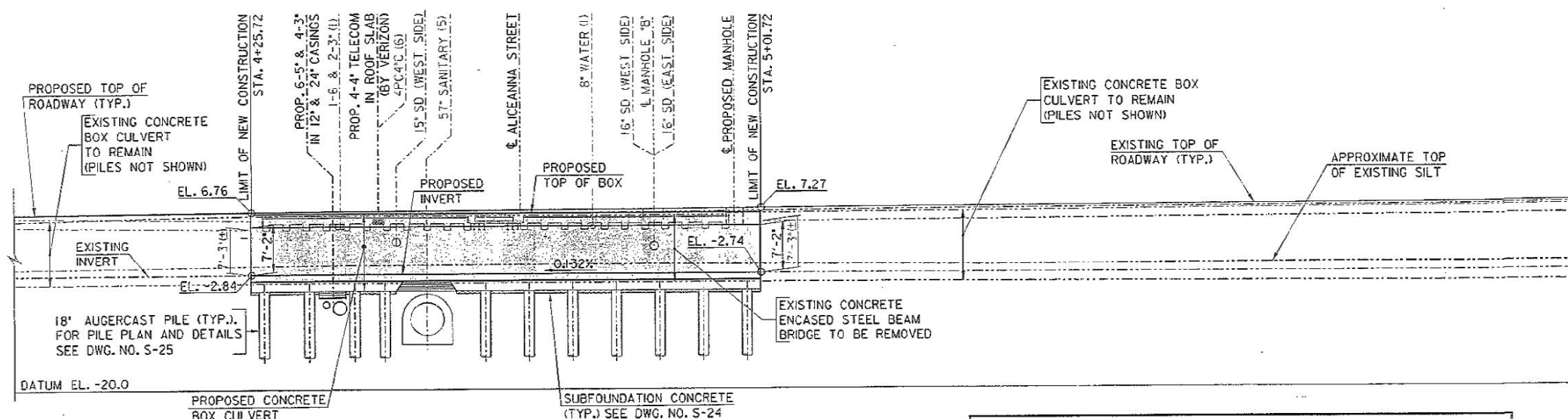
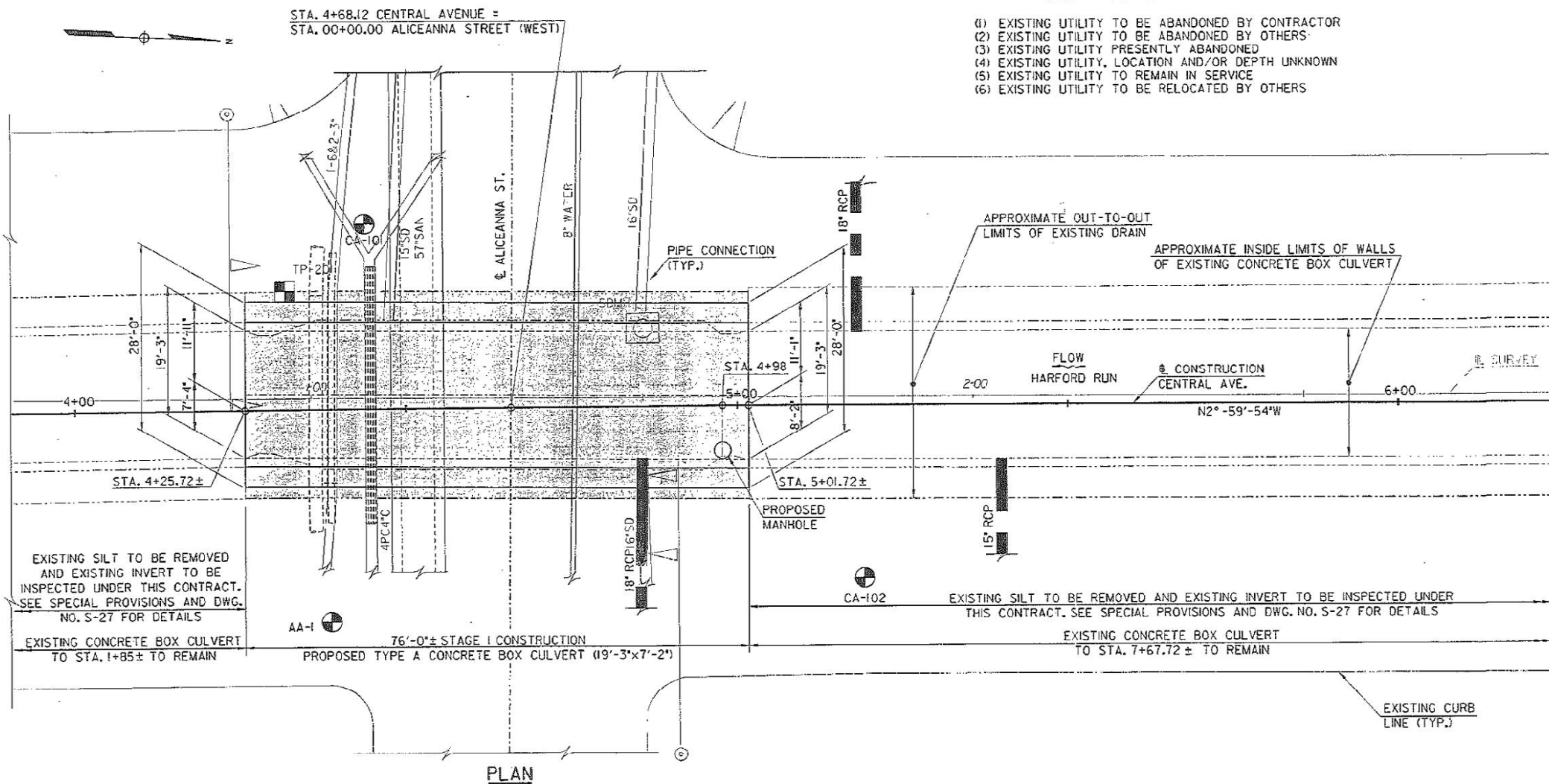
UTILITY DISPOSITION KEY

- (1) EXISTING UTILITY TO BE ABANDONED BY CONTRACTOR
- (2) EXISTING UTILITY TO BE ABANDONED BY OTHERS
- (3) EXISTING UTILITY PRESENTLY ABANDONED
- (4) EXISTING UTILITY, LOCATION AND/OR DEPTH UNKNOWN
- (5) EXISTING UTILITY TO REMAIN IN SERVICE
- (6) EXISTING UTILITY TO BE RELOCATED BY OTHERS

GENERAL NOTES

F.H.W.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	MD	SEE COVER SHEET	98	281

- SPECIFICATIONS:** -SHA SPECIFICATIONS DATED JANUARY, 2001.
-REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIALS AND CONSTRUCTION.
- DESIGN SPECIFICATIONS:** AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES DATED 1996, INCLUDING INTERIM SPECIFICATIONS THROUGH 1998.
CONCRETE DESIGN: SERVICE LOAD DESIGN METHOD, $f_c = 0.4f'_c$.
REINFORCING STEEL DESIGN: $f_s = 24,000$ PSI.
- LOADINGS:** LIVE LOAD: HS 25 TRUCK.
LIVE LOAD SURCHARGE: MINIMUM OF 2 FEET OF EARTH ON BOX CULVERT WALLS AND WHERE APPROPRIATE.
EARTH: UNIT WEIGHT OF 125 PCF. INTERNAL ANGLE OF FRICTION EQUAL TO 25 DEGREES.
- CAST-IN-PLACE CONCRETE:** ALL CAST-IN-PLACE CONCRETE SHALL BE MIX NO. 6 ($f'_c = 4,500$ PSI) EXCEPT CONCRETE FOR AUGER CAST PILES SHALL BE MIX NO. 3 ($f'_c = 3,500$ PSI).
- PRECAST CONCRETE:** ALL PRECAST CONCRETE SHALL DEVELOP A 28 DAY MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI. THE DESIGN MIX SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO USE.
- REINFORCING STEEL:** DEFORMED BARS SHALL CONFORM TO ASTM A 615, GRADE 60 AND WELDED WIRE FABRIC SHALL CONFORM TO AASHTO M55 OR M221. ALL SPLICES NOT SHOWN SHALL BE LAPPED IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS. MINIMUM COVER FOR CAST-IN-PLACE CONCRETE SHALL BE 2" UNLESS OTHERWISE NOTED. MINIMUM COVER FOR PRECAST CONCRETE SHALL BE 1 1/2". ALL TRANSVERSE AND LONGITUDINAL REINFORCING STEEL IN AND PENETRATING INTO THE TOP SLABS OF BOX TYPES A, B AND C SHALL BE EPOXY COATED.
- POST-TENSIONING STEEL:** POST TENSIONING STEEL SHALL BE 1/2" DIAMETER, SEVEN WIRE, LOW RELAXATION STRANDS HAVING A YIELD STRENGTH OF 270 KSI. STRANDS SHALL BE STRESSED TO 25,000 POUNDS.
- KEYS:** ALL KEYS ARE NOMINAL SIZE.
- EXISTING STRUCTURE:** ALL DIMENSIONS AFFECTED BY THE GEOMETRICS AND/OR LOCATION OF THE EXISTING DRAIN SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR BEFORE ANY CONSTRUCTION IS DONE, AND BEFORE ANY REINFORCING STEEL, PRECAST CONCRETE BOX CULVERTS, ETC., ARE ORDERED OR FABRICATED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY THE ENGINEER WITH ALL FIELD DIMENSIONS REQUIRED TO CHECK DETAIL DRAWINGS. THE (M) MARKS SHOWN WITH DIMENSIONS AND STATIONS DO NOT INDICATE ANY DEGREE OF PRECISION. THESE (M) INDICATE EXISTING DIMENSIONS AND STATIONS THAT MAY VARY AND DO REQUIRE FIELD VERIFICATION BY THE CONTRACTOR.
- DRAWING:** EXISTING DRAIN AND UTILITIES SHOWN SCREENED.
SURVEY BASELINE SHOWN SCREENED.
PROPOSED CONSTRUCTION AND CONSTRUCTION BASELINE SHOWN AS HEAVY SOLID LINES.
- PLANS OF EXISTING PERTINENT STRUCTURE(S) ARE AVAILABLE TO THE CONTRACTOR FOR REVIEW. NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS IS ASSUMED BY THE ADMINISTRATION. DIMENSIONS, DETAILS, ETC., AS SHOWN THEREON MAY NOT BE AS BUILT. OTHER CONTRACTS INCLUDE BALTIMORE CITY CONTRACT NOS. 3052, DATED 1985 AND TR99049, DATED 1999.



PROFILE

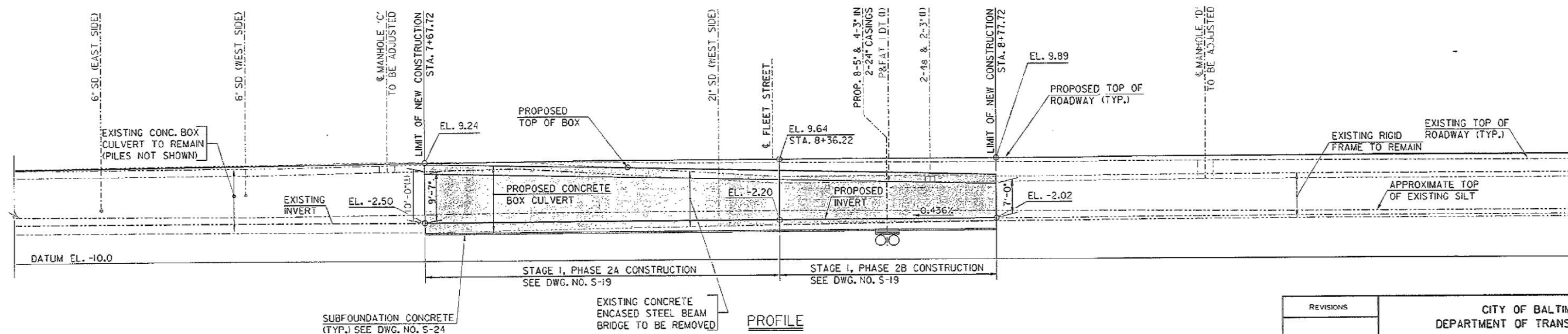
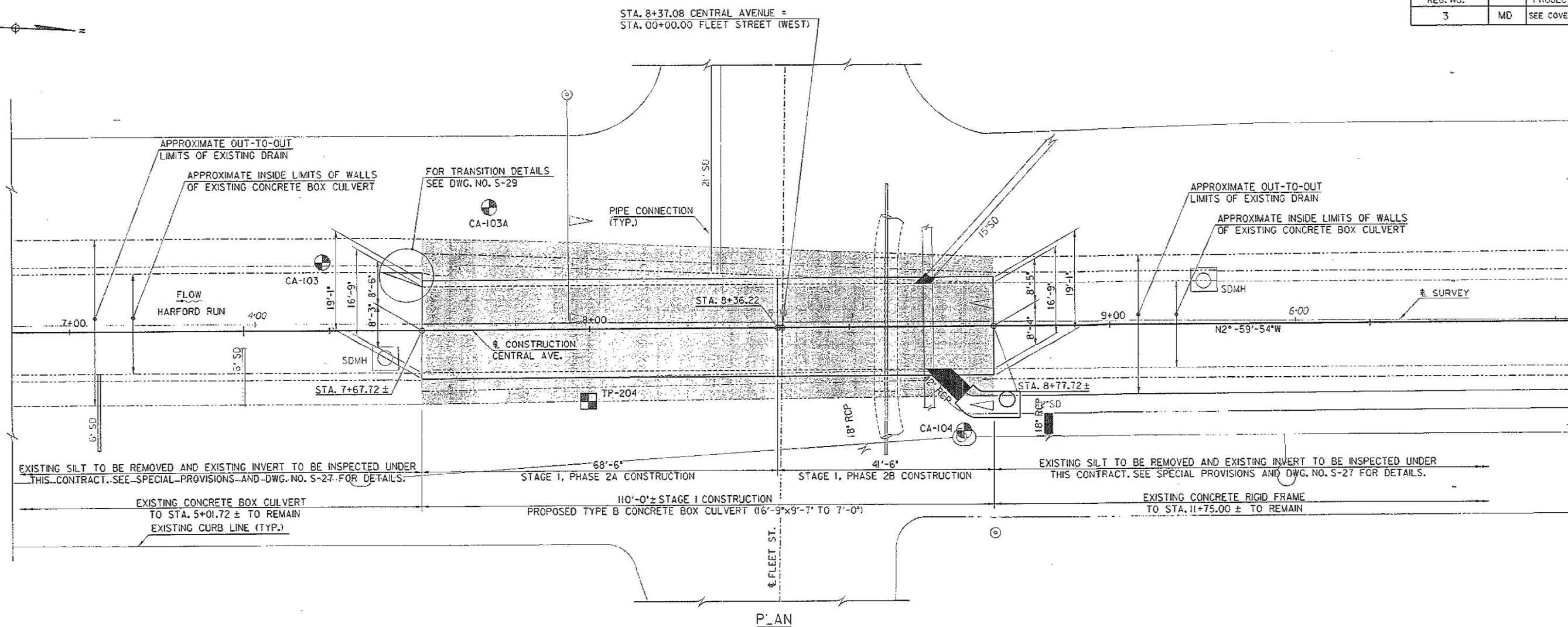
- NOTES:**
1. FOR PROPOSED TYPICAL SECTION, SEE DWG. NO. S-25.
 2. FOR EXISTING TYPICAL SECTIONS, SEE DWG. NOS. S-15 THRU S-17.
 3. ALL UTILITIES ARE EXISTING UNLESS OTHERWISE NOTED.
 4. THE CONTRACTOR SHALL PROVIDE OPENINGS IN THE BOX CULVERT FOR PROPOSED STORM DRAIN CONNECTIONS. FOR ADDITIONAL REINFORCING DETAILS AT OPENINGS, SEE DWG. NO. S-28. FOR STORM DRAIN CONNECTION DETAILS, SEE DWG. NO. S-20.
 5. LIMITS OF EXISTING DRAIN VARY AND ARE APPROXIMATE BASED ON TEST PIT INFORMATION. CONTRACTOR SHALL VERIFY LIMITS PRIOR TO BEGINNING WORK.
 6. FOR SEQUENCE OF CONSTRUCTION, SEE DWG. NO. S-18.
 7. TOP OF PROPOSED ROADWAY ELEVATIONS AND PROPOSED INVERTS ARE SHOWN.
 8. FOR PROPOSED MANHOLE DETAILS, SEE DWG. NO. S-19.
 9. FOR ADDITIONAL BORING AND TEST PIT INFORMATION NOT SHOWN, SEE DWG. NOS. TH-1 THRU TH-10.
 10. FOR TIE-IN DETAILS AT THE INTERFACE OF EXISTING AND PROPOSED STRUCTURES SEE DWG. NO. S-29 THRU S-33.

THESE PLANS AND THE CONTRACT DOCUMENTS PRESENT A CAST-IN-PLACE STRUCTURE UNLESS OTHERWISE NOTED. THE CONTRACTOR IS ALERTED THAT THE CONTRACT DOCUMENTS PROVIDE FOR A PRECAST ALTERNATE FOR THE AREAS SHOWN IN THE CHART ON DWG. NO. S-24. AREAS EXIST WHERE C.I.P. CONCRETE BOX CULVERTS ARE REQUIRED AS STATED IN THE CONTRACT DOCUMENTS, SUCH AS AT TRANSITIONS BETWEEN EXISTING AND PROPOSED DRAIN SEGMENTS. OTHER AREAS MAY REQUIRE CAST-IN-PLACE SEGMENTS IN ORDER TO ACCOMMODATE EXISTING UTILITIES. IF A PRECAST ALTERNATE IS SELECTED AT ANY OF THE APPROVED LOCATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING ALL PERTINENT DESIGNS AND SUBMITTALS FOR THE ENGINEER'S APPROVAL. THE CONTRACTOR SHALL SUBMIT ONLY ONE BID FOR EACH BOX TYPE REGARDLESS IF C.I.P. OR PRECAST.

NOTE: UNLESS OTHERWISE NOTED ALL STATIONS AND OFFSETS ARE FROM THE CENTRAL AVE. C.O. OF CONSTRUCTION.

R&K RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
BALTIMORE, MARYLAND

REVISIONS			
CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION			
RECONSTRUCTION OF CENTRAL AVENUE FROM LANCASTER STREET TO 200' NORTH OF MADISON STREET			
BOX CULVERT PLAN AND PROFILE STA. 4+25.72 ± TO STA. 5+01.72 ± ALICEANNA STREET			
SCALE 1" = 10'	DATE JULY 2003	CONTRACT	TR00017
DESIGNED BY: LHM	DRAWN BY: MHB	CHECKED BY: GVK	
SHEET NO. 98 OF 281			



- NOTES:
1. FOR PROPOSED TYPICAL SECTIONS, SEE DWG. NO. S-26.
 2. FOR EXISTING TYPICAL SECTIONS, SEE DWG. NOS. S-15 THRU S-17.
 3. ALL UTILITIES ARE EXISTING UNLESS OTHERWISE NOTED.
 4. THE CONTRACTOR SHALL PROVIDE OPENINGS IN THE BOX CULVERT FOR PROPOSED STORM DRAIN CONNECTIONS. FOR ADDITIONAL REINFORCING DETAILS AT OPENINGS, SEE DWG. NO. S-28 FOR STORM DRAIN CONNECTION DETAILS, SEE DWG. NOS. S-19 AND S-20.
 5. LIMITS OF EXISTING DRAIN VARY AND ARE APPROXIMATE BASED ON TEST PIT INFORMATION. CONTRACTOR SHALL VERIFY LIMITS PRIOR TO BEGINNING WORK.

6. FOR SEQUENCE OF CONSTRUCTION, SEE DWG. NOS. S-18 & S-19.
7. TOP OF PROPOSED ROADWAY ELEVATIONS AND PROPOSED INVERTS ARE SHOWN.
8. FOR PROPOSED MANHOLE DETAILS, SEE DWG. NO. S-19.
9. FOR ADDITIONAL BORING AND TEST PIT INFORMATION NOT SHOWN, SEE DWG. NOS. TH-1 THRU TH-10.
10. FOR TIE-IN DETAILS AT THE INTERFACE OF EXISTING AND PROPOSED STRUCTURES SEE DWG. NOS. S-29 AND S-33.
11. FOR UTILITY DISPOSITION KEY, SEE DWG. NO. S-1.

- DENOTES APPROXIMATE LIMITS OF EXISTING STRUCTURE TO BE REMOVED AND REPLACED.
 DENOTES TEST PIT LOCATION
 DENOTES BORING LOCATION

NOTE:
UNLESS OTHERWISE NOTED
ALL STATIONS AND OFFSETS
ARE FROM THE CENTRAL
AVE. OF CONSTRUCTION.

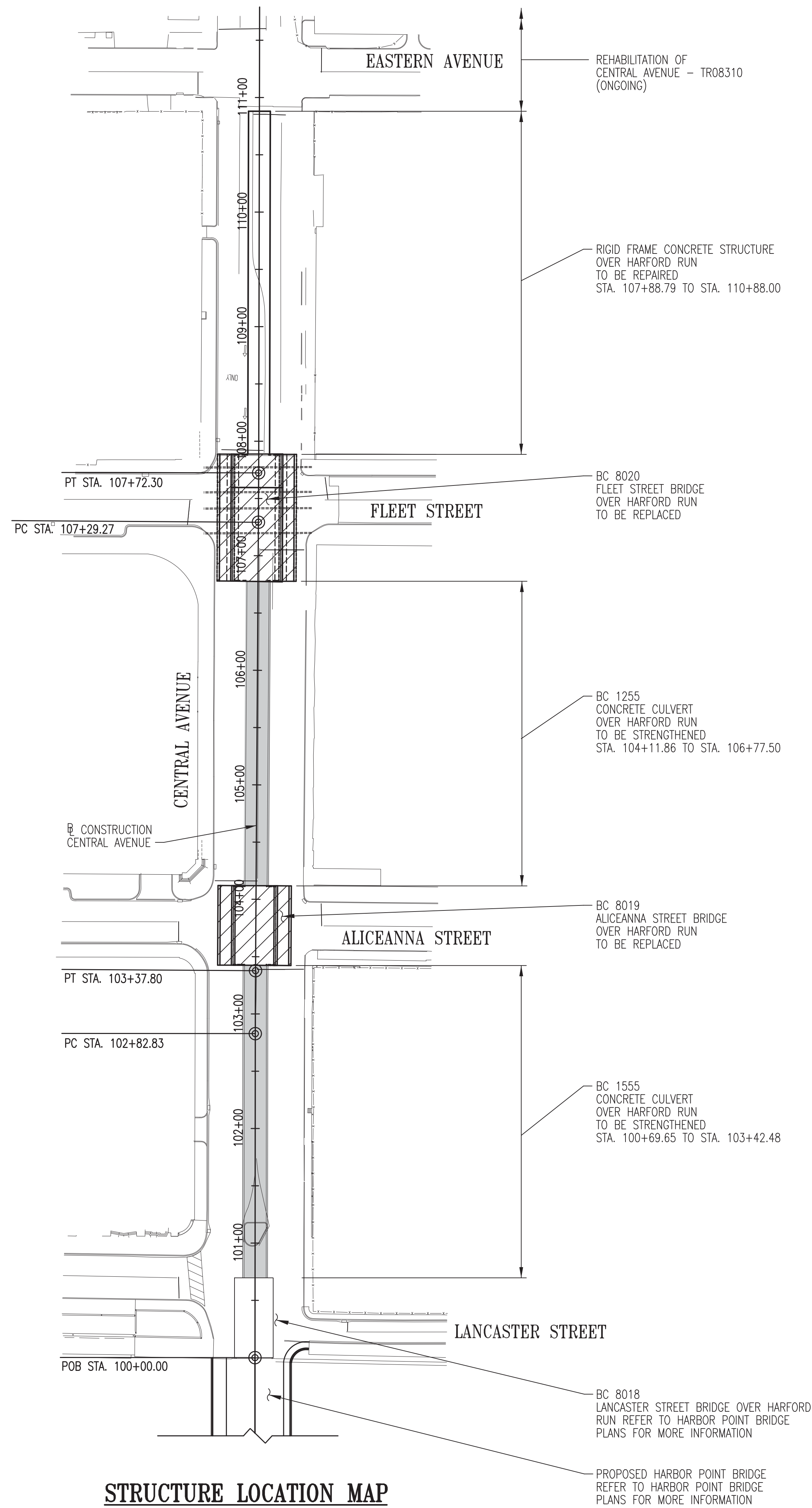
RUMMEL, KLEPPER & KAHL, LLP
 CONSULTING ENGINEERS
 BALTIMORE, MARYLAND

CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION RECONSTRUCTION OF CENTRAL AVENUE FROM LANCASTER STREET TO 200' NORTH OF MADISON STREET BOX CULVERT PLAN AND PROFILE STA. 7+67.72 ± TO STA. 8+77.72 ± FLEET STREET	
SCALE 1" = 10' DESIGNED BY LMM DRAWN BY MHB CHECKED BY CVK	DATE JULY 2003 CONTRACT TRO0017 SHEET NO. 99 OF 281

Appendix D

TYPE, SIZE AND LOCATION PLANS

REVISIONS			
NO.	DESCRIPTION	DATE	BY



STRUCTURE LOCATION MAP
SCALE: 1"=60'-0"

LEGEND:

	REPLACED
	STRENGTHENED
	REPAIRED

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V., W.A.G.



SP01

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETScape AND
HARBOR POINT CONNECTOR BRIDGE

STRUCTURE LOCATION MAP

SCALE: AS SHOWN DATE: OCTOBER, 2012

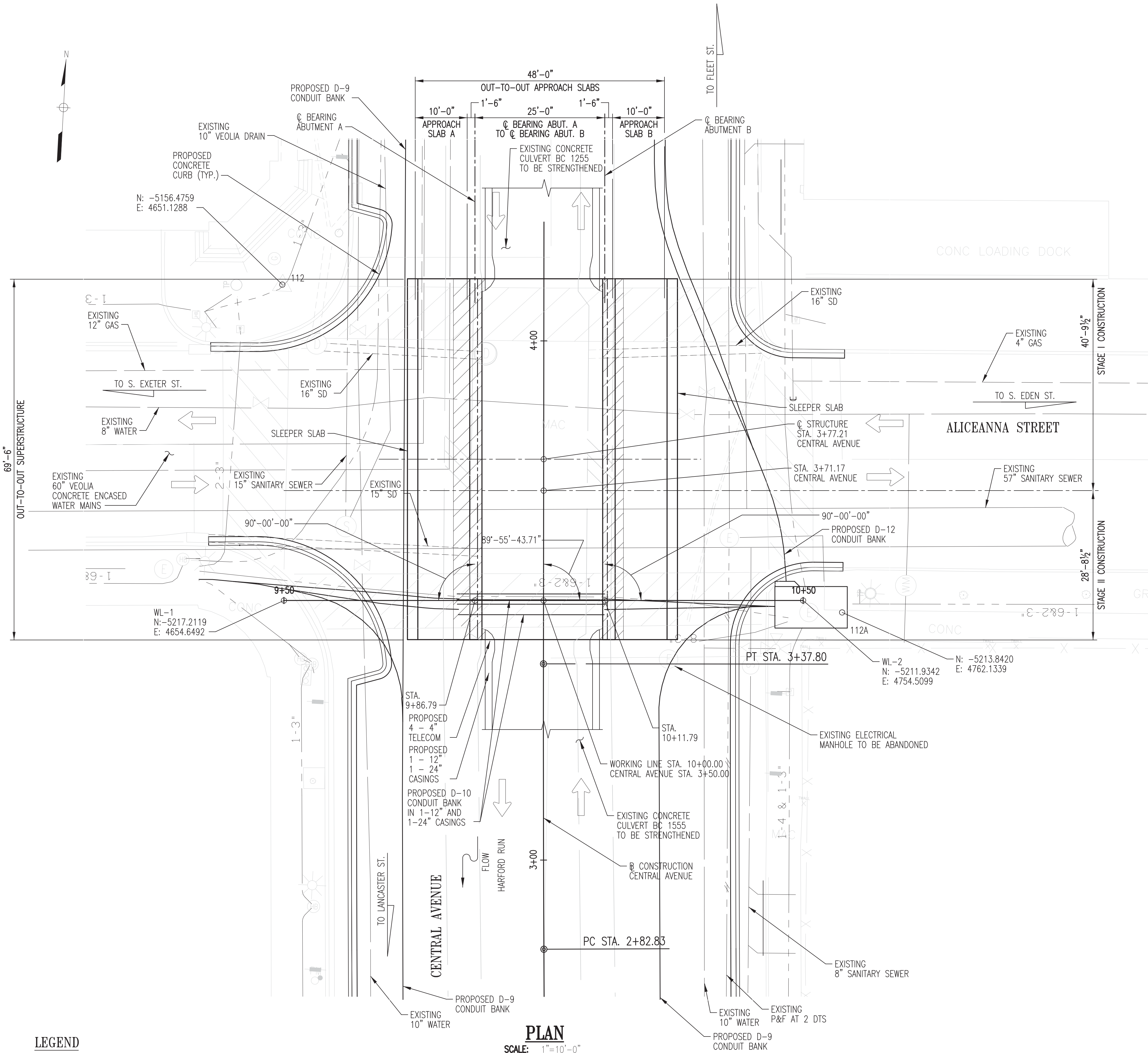
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

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REVISIONS			
NO.	DESCRIPTION	DATE	BY

GENERAL NOTES

- SPECIFICATIONS: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH SHA SPECIFICATIONS DATED 2008, INCLUDING ALL REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIALS AND CONSTRUCTION.
- AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS DATED 2012 (6th EDITION)
- CONCRETE DESIGN: LOAD AND RESISTANCE FACTOR (LRFD) DESIGN
- REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI.
- PRESTRESSED CONCRETE DESIGN: PRESTRESSED CONCRETE DESIGN: LOAD AND RESISTANCE FACTOR DESIGN METHOD, MAXIMUM ALLOWABLE TENSILE STRESS IN PRE-COMPRESSED TENSILE ZONE = $3\sqrt{f'_c}$. THE PRECAST CONCRETE BEAMS ARE DESIGNED AS NONCOMPOSITE SIMPLE SPAN FOR ALL DEAD LOADS EXCEPT THE WEARING SURFACE. THE PRECAST BEAMS ARE DESIGNED AS COMPOSITE SIMPLE SPAN FOR LIVE LOAD AS WELL AS THE WEARING SURFACE DEAD LOAD.
- REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI (NONPRETENSIONING STEEL)
- LOADING: HL-93 PLUS 2" FUTURE WEARING SURFACE.
- CONCRETE: ALL CONCRETE FOR ABUTMENT BACKWALLS AND ENTIRE SUPERSTRUCTURE SHALL BE MIX NO. 6 (4,500 PSI). ALL OTHER STRUCTURE CONCRETE SHALL BE MIX NO. 3 (3,500 PSI.)
- REINFORCING STEEL: REINFORCING STEEL SHALL CONFORM TO A 615, GRADE 60. ALL SPLICES, NOT SHOWN, SHALL BE LAPPED AS PER BAR LAP CHARTS. MINIMUM COVER FOR ANY BAR SHALL BE 2" UNLESS OTHERWISE NOTED, WITH THE EXCEPTION OF BARS AT THE BOTTOM AND SIDES OF ALL FOOTINGS WHICH SHALL HAVE 3" MINIMUM COVER.
- FOR TIES AND STIRRUPS; STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCES.
- ONLY GRADE 60 CAN BE USED ON THIS PROJECT
- REINFORCING STEEL IN THE FOLLOWING AREAS SHALL BE EPOXY COATED:
- ENTIRE SUPERSTRUCTURE
 - ABUTMENT BACKWALLS
 - ALL BEARING SEAT PADS
 - ABUTMENT BRIDGE SEAT AREAS
 - APPROACH SLABS
 - SLEEPER SLABS
- KEYS: ALL KEYS ARE NOMINAL SIZE.
- PRESTRESSED CONCRETE: THE MINIMUM COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE AT THE AGE OF 28 DAYS SHALL BE $f'_c=7,000$ PSI. THE MINIMUM COMPRESSIVE STRENGTH AT THE TRANSFER OF PRESTRESS SHALL BE $f'_c=5,700$ PSI.
- PRESTRESSED STRANDS: PRETENSIONING STEEL SHALL CONSIST OF .6" DIAMETER 7-WIRE BRIGHT LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF M 203, GRADE 270. EACH .6" STRAND SHALL BE PRETENSIONED TO 43,943 LBS (0.75 F'S). AFTER ESTIMATED LOSSES OF 3,674 LBS., THE FINAL EFFECTIVE PRESTRESS FORCE PER STRAND IS 40,269 LBS. CAMBER GROWTH IN PRETENSIONED BEAMS BETWEEN THE TIME OF STRESSING AND THE TIME OF SLAB PLACEMENT IS ASSUMED TO BE 60% FOR CAMBER CALCULATIONS.
- HANDLING PRESTRESSED UNITS: IN HANDLING, THE UNITS MUST BE MAINTAINED IN AN UPRIGHT POSITION AT ALL TIMES AND MUST BE PICKED UP ONLY BY MEANS OF LIFTING DEVICES PROVIDED.
- EXISTING STRUCTURE: ALL DIMENSIONS AFFECTED BY THE GEOMETRICS, AND/OR EXISTING STRUCTURE SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR, BEFORE ANY CONSTRUCTION IS DONE, AND BEFORE ANY REINFORCING STEEL, ETC., IS ORDERED AND FABRICATED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY THE ENGINEER WITH ALL FIELD DIMENSIONS REQUIRED TO CHECK DETAIL DRAWINGS. THE \pm MARKS SHOWN WITH DIMENSIONS AND STATIONS DO NOT INDICATE ANY DEGREE OF PRECISION. THESE MARKS (\pm) INDICATE EXISTING DIMENSIONS AND STATIONS THAT MAY VARY AND DO REQUIRE FIELD VERIFICATION BY THE CONTRACTOR.
- EXISTING STRUCTURE SHOWN IN LONG DASHED LINES.
- PORTIONS OF EXISTING STRUCTURES SHOWN HATCHED, TO BE REMOVED.
- EXISTING PLANS: FOR THE CONVENIENCE AND INFORMATION OF BIDDERS, PRINTS OF PLANS OF THE EXISTING PERTINENT STRUCTURES ARE AVAILABLE AT THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, FOR THE CONTRACTOR'S REVIEW. NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS IS ASSUMED BY THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, DIMENSIONS, DETAILS, ETC. AS SHOWN THEREON MAY NOT BE "AS BUILT".
- UTILITIES: THE DESIGN-BUILDER IS RESPONSIBLE FOR IDENTIFYING, LOCATING, AND RELOCATING, AS NECESSARY, ALL EXISTING UTILITIES WITHIN THE PROJECT AREA. THE UTILITIES SHOWN HEREON ARE FOR REFERENCE ONLY AND THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, TAKES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE UTILITY INFORMATION SHOWN HEREON.



LEGEND

 PORTION OF EXISTING ABUTMENT TO BE REMOVED (TYP.)

PLAN

SCALE: 1"=10'-0"

DRAWN BY: K.W.F.
EXAMINED BY: N.Z.



CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA, NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETScape AND
HARBOR POINT CONNECTOR BRIDGE
GENERAL PLAN – ALTERNATIVE "A-1"
ALICEANNA STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

N:\31576-007\CADD\Bridge\31576007GP04.dgn

REVISIONS			
NO.	DESCRIPTION	DATE	BY

GENERAL NOTES

SPECIFICATIONS: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH SHA SPECIFICATIONS DATED 2008, INCLUDING ALL REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIALS AND CONSTRUCTION.

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS DATED 2012 (6th EDITION)

CONCRETE DESIGN: LOAD AND RESISTANCE FACTOR (LRFD) DESIGN

REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI.

PRESTRESSED CONCRETE DESIGN:

PRESTRESSED CONCRETE DESIGN: LOAD AND RESISTANCE FACTOR DESIGN METHOD, MAXIMUM ALLOWABLE TENSILE STRESS IN PRE-COMPRESSED TENSILE ZONE = $3\sqrt{f_c}$. THE PRECAST CONCRETE BEAMS ARE DESIGNED AS NONCOMPOSITE SIMPLE SPAN FOR ALL DEAD LOADS EXCEPT THE WEARING SURFACE. THE PRECAST BEAMS ARE DESIGNED AS COMPOSITE SIMPLE SPAN FOR LIVE LOAD AS WELL AS THE WEARING SURFACE DEAD LOAD.

REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI (NONPRETENSIONING STEEL)

LOADING:

HL-93 PLUS 2" FUTURE WEARING SURFACE.

CONCRETE:

ALL CONCRETE FOR ABUTMENT BACKWALLS AND ENTIRE SUPERSTRUCTURE SHALL BE MIX NO. 6 (4,500 PSI). ALL OTHER STRUCTURE CONCRETE SHALL BE MIX NO. 3 (3,500 PSI.)

REINFORCING
STEEL:

REINFORCING STEEL SHALL CONFORM TO A 615, GRADE 60. ALL SPLICES NOT SHOWN, SHALL BE LAPPED AS PER BAR LAP CHARTS. MINIMUM COVER FOR ANY BAR SHALL BE 2" UNLESS OTHERWISE NOTED, WITH THE EXCEPTION OF BARS AT THE BOTTOM AND SIDES OF ALL FOOTINGS WHICH SHALL HAVE 3" MINIMUM COVER.

FOR TIES AND STIRRUPS; STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCES.

ONLY GRADE 60 CAN BE USED ON THIS PROJECT

REINFORCING STEEL IN THE FOLLOWING AREAS SHALL BE EPOXY COATED

- ENTIRE SUPERSTRUCTURE
- ABUTMENT BACKWALLS
- ALL BEARING SEAT PADS
- ABUTMENT BRIDGE SEAT AREAS
- APPROACH SLABS
- SLEEPER SLABS

KEYS:

ALL KEYS ARE NOMINAL SIZE

PRESTRESSED CONCRETE:

THE MINIMUM COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE AT THE AGE OF 28 DAYS SHALL BE $f'_c=7,000$ PSI. THE MINIMUM COMPRESSIVE STRENGTH AT THE TRANSFER OF PRESTRESS SHALL BE $f'_c=5,700$ PSI.

PRESTRESSED STRANDS:

PRETENSIONING STEEL SHALL CONSIST OF .6" DIAMETER 7-WIRE BRIGHT LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF M 203, GRADE 270. EACH .6" STRAND SHALL BE PRETENSIONED TO 43,943 LBS (0.75 F_s). AFTER ESTIMATED LOSSES OF 3,841 LBS., THE FINAL EFFECTIVE PRESTRESS FORCE PER STRAND IS 40,102 LBS. CAMBER GROWTH IN PRETENSIONED BEAMS BETWEEN THE TIME OF STRESSING AND THE TIME OF SLAB PLACEMENT IS ASSUMED TO BE 60% FOR CAMBER CALCULATIONS.

HANDLING PRESTRESSED UNITS:

IN HANDLING, THE UNITS MUST BE MAINTAINED IN AN UPRIGHT POSITION AT ALL TIMES AND MUST BE PICKED UP ONLY BY MEANS OF LIFTING DEVICES PROVIDED.

EXISTING STRUCTURE:

ALL DIMENSIONS AFFECTED BY THE GEOMETRICS, AND/OR EXISTING STRUCTURE SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR, BEFORE ANY CONSTRUCTION IS DONE, AND BEFORE ANY REINFORCING STEEL, ETC., IS ORDERED AND FABRICATED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY THE ENGINEER WITH ALL FIELD DIMENSIONS REQUIRED FOR DETAIL OR DERIVED FROM THE DRAWINGS. DIMENSIONS AND STATIONS DO NOT INDICATE ANY DEGREE OF PRECISION. THESE MARKS (±) INDICATE EXISTING DIMENSIONS AND STATIONS THAT MAY VARY AND DO REQUIRE FIELD VERIFICATION BY THE CONTRACTOR.

EXISTING STRUCTURE SHOWN IN LONG DASHED LINES

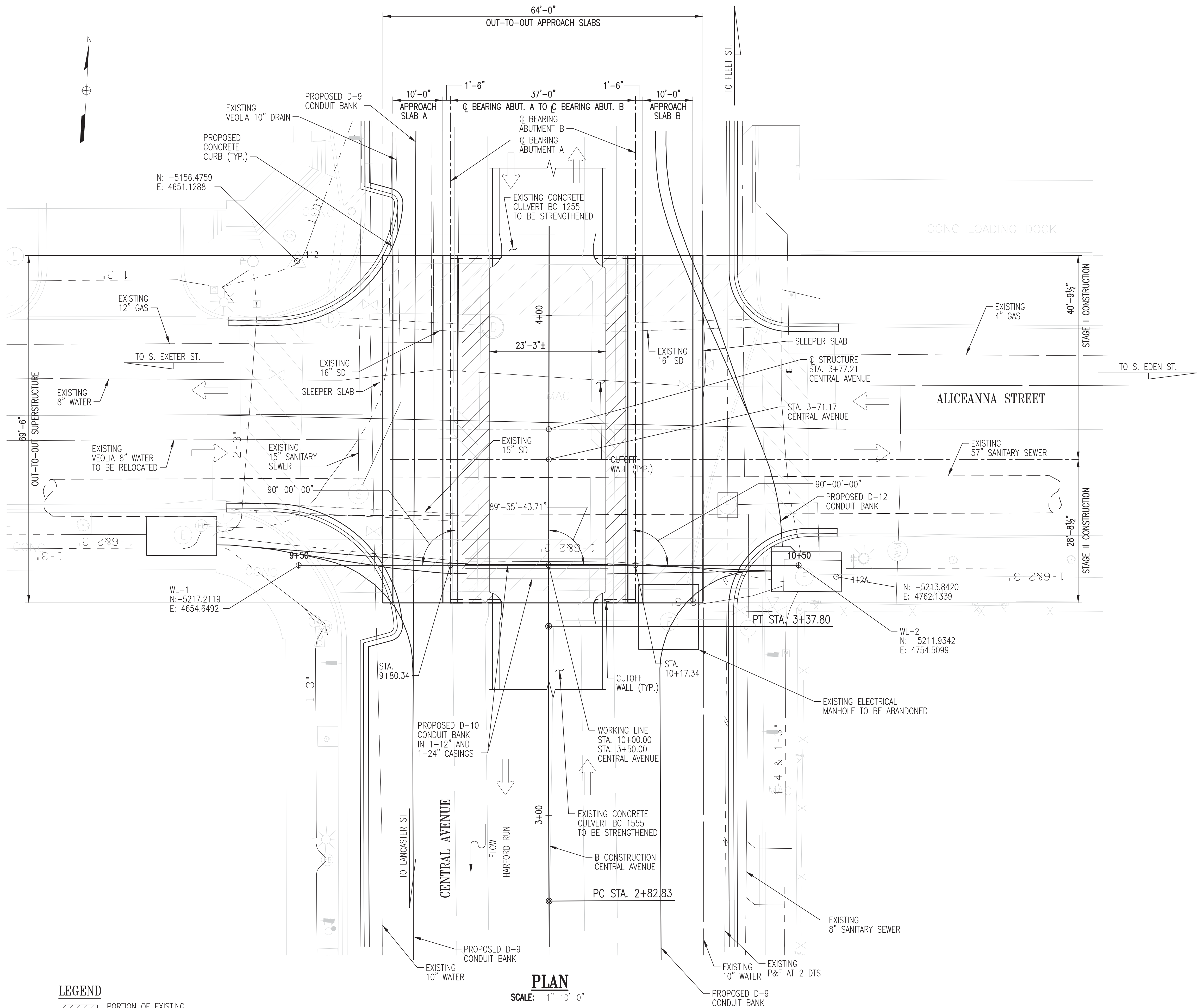
PORTIONS OF EXISTING STRUCTURES SHOWN HATCHED, TO BE REMOVED

EXISTING PLANS:

FOR THE CONVENIENCE AND INFORMATION OF BIDDERS, PRINTS OF PLANS OF THE EXISTING PERTINENT STRUCTURES ARE AVAILABLE AT THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, FOR THE CONTRACTOR'S REVIEW. NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS IS ASSUMED BY THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, DIMENSIONS, DETAILS, ETC. AS SHOWN THEREON MAY NOT BE "AS BUILT".

UTILITIES:

THE DESIGN-BUILDER IS RESPONSIBLE FOR IDENTIFYING, LOCATING, AND RELOCATING, AS NECESSARY, ALL EXISTING UTILITIES WITHIN THE PROJECT AREA. THE UTILITIES SHOWN HEREON ARE FOR REFERENCE ONLY AND THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, TAKES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE UTILITY INFORMATION SHOWN HEREON.



LEGEND

 PORTION OF EXISTING
ABUTMENT TO BE REMOVED (TYP.)

PLAN
SCALE: 1"=10'-0"

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



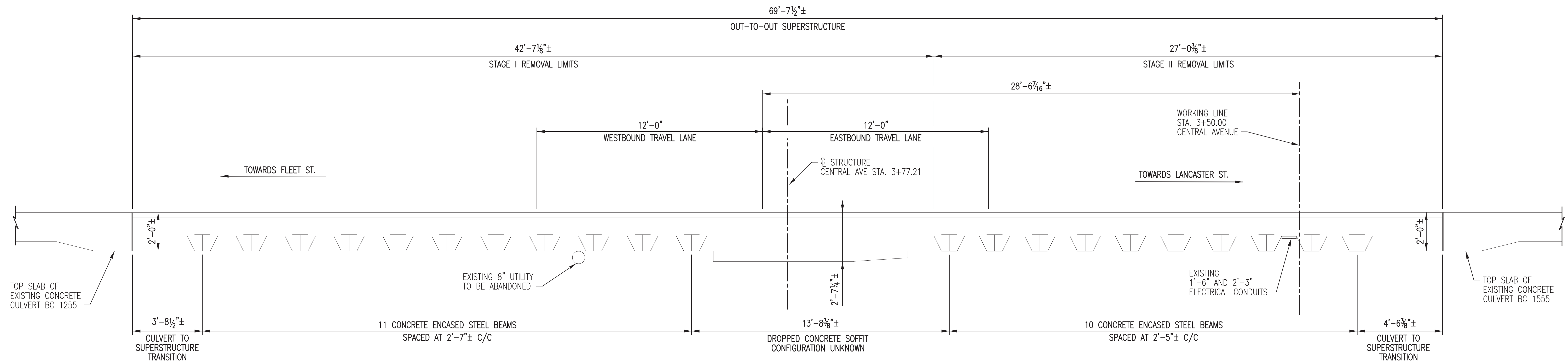
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
GENERAL PLAN – ALTERNATIVE "A-2"
ALICEANNA STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012

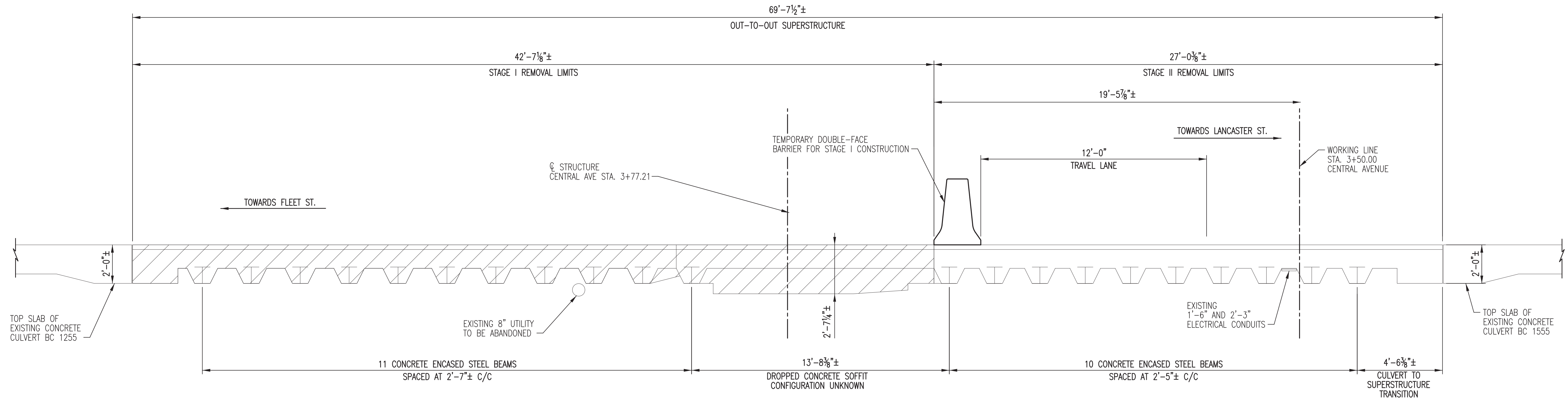
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION	SHEET	OF
N:\31576-007\CADD\Bridge\31576007GP02.dgn		

REVISIONS			
NO.	DESCRIPTION	DATE	BY



EXISTING TYPICAL SECTION

SCALE: 3/8"=1'-0"



STAGE I REMOVAL TYPICAL SECTION

SCALE: 3/8"=1'-0"

LEGEND

PORTION OF EXISTING SUPERSTRUCTURE TO BE REMOVED (TYP.)

NOTE:

EXISTING TYPICAL SECTION BASED ON FIELD SURVEY BY WR&A ON JUNE, 2012. SHOWN FOR INFORMATION ONLY. DESIGN-BUILD TEAM IS RESPONSIBLE FOR VERIFYING THE AS BUILT DIMENSIONS PRIOR TO CONSTRUCTION.

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



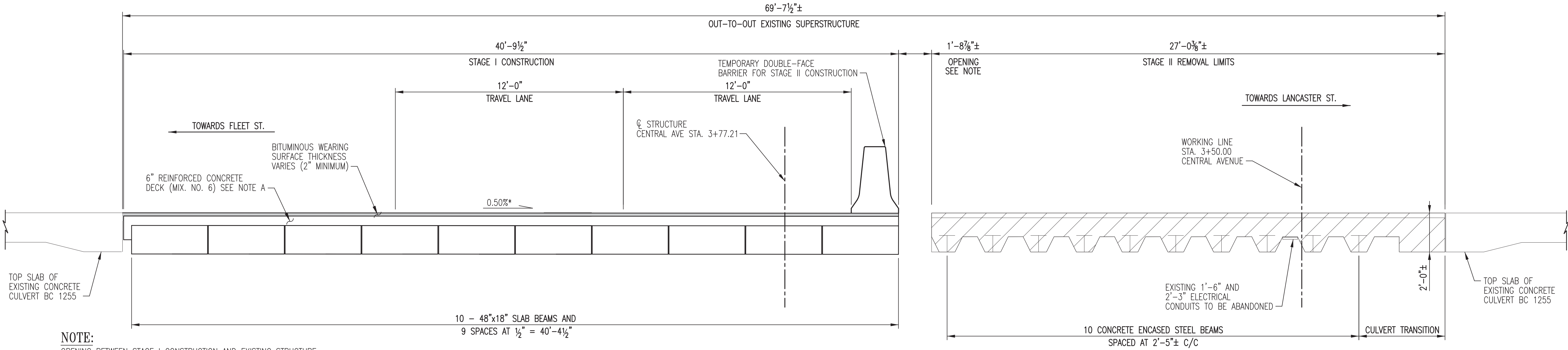
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
EXISTING TYPICAL SECTION
ALICEANNA STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

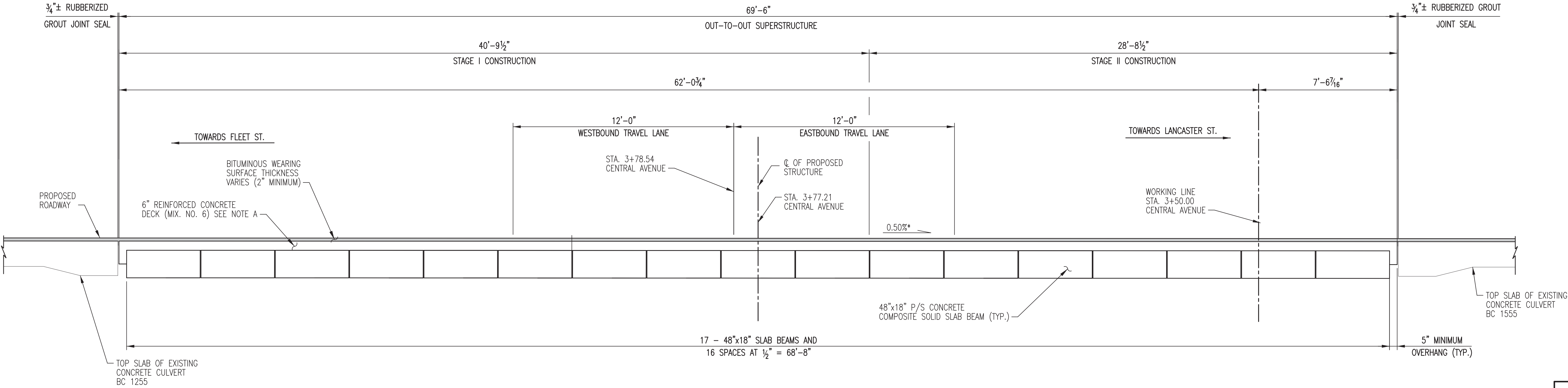
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REVISIONS			
NO.	DESCRIPTION	DATE	BY



STAGE II REMOVAL TYPICAL SECTION

SCALE: 3/8"=1'-0"



PROPOSED TYPICAL SECTION

SCALE: 3/8"=1'-0"

*- FINAL CROSS-SLOPE OF STRUCTURE TO BE SET BY DESIGN-BUILD TEAM AFTER THE PROPOSED ROADWAY PROFILE FOR CENTRAL AVENUE IS ESTABLISHED. VALUE SHOWN IS BASED ON EXISTING ROADWAY ELEVATIONS.

LEGEND

PORTION OF EXISTING SUPERSTRUCTURE TO BE REMOVED (TYP.)

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.

WR&A
WHITMAN, REQUARDT & ASSOCIATES, LLP
800 South Caroline Street, Baltimore, Maryland 21201

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA, NO. PENDING
F.A.P. PENDING

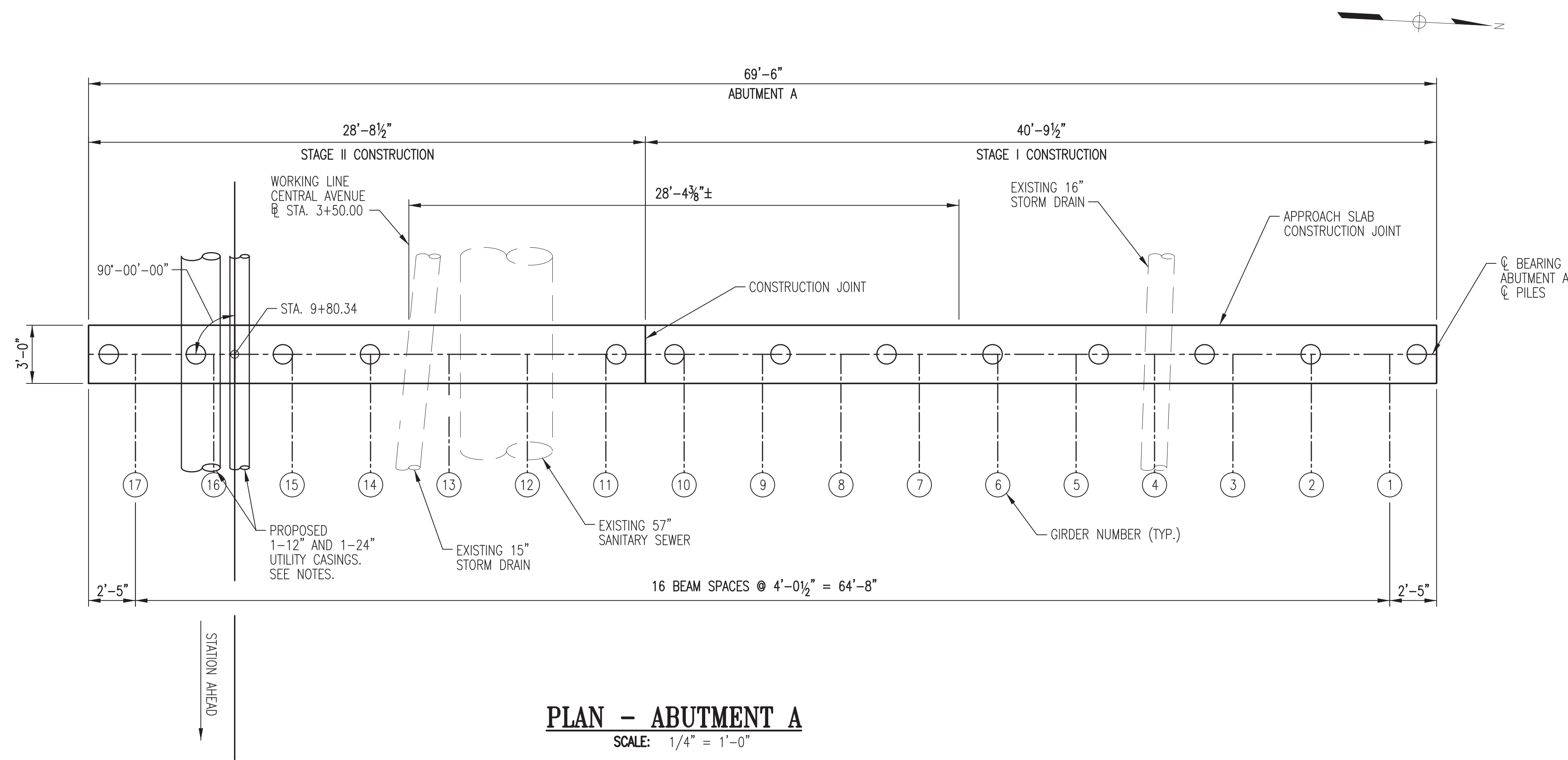
CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
TYPICAL SECTION - ALTERNATIVE "A-2"
ALICEANNA STREET OVER HARFORD RUN

SCALE: AS SHOWN
DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

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SP05

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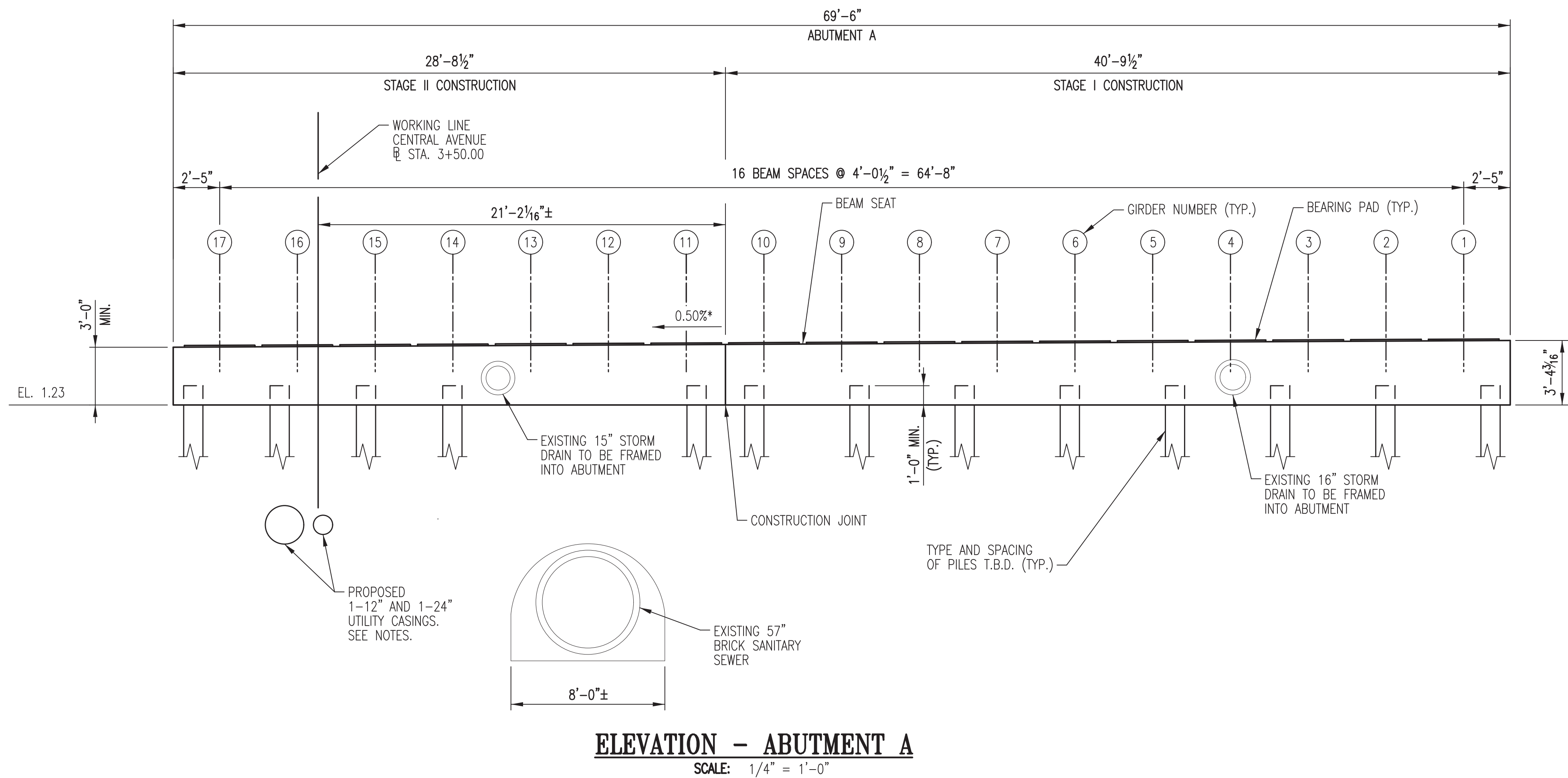


NOTES:

ABUTMENT A SHOWN. ABUTMENT B SIMILAR BUT OPPOSITE HAND. EXISTING ABUTMENT NOT SHOWN FOR CLARITY.

THE DESIGN-BUILDER IS RESPONSIBLE FOR IDENTIFYING, LOCATING, AND RELOCATING, AS NECESSARY, ALL EXISTING UTILITIES WITHIN THE PROJECT AREA. THE UTILITIES SHOWN HEREON ARE FOR REFERENCE ONLY AND THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, TAKES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE UTILITY INFORMATION SHOWN HEREON.

THE PROPOSED CASINGS SHOWN ARE FOR REFERENCE ONLY. THE DESIGN-BUILDER IS RESPONSIBLE FOR DETERMINING THE LOCATION, SIZE, MATERIAL, AND NUMBER OF CASINGS TO BE INSTALLED. CASINGS ARE TO BE DESIGNED TO AVOID CONFLICTS WITH THE PROPOSED PILES FOR THE BRIDGE. THE CASINGS SHALL ONLY BE INSTALLED AFTER THE PROPOSED PILES HAVE BEEN INSTALLED.



*- FINAL CROSS-SLOPE OF STRUCTURE TO BE SET BY DESIGN-BUILD TEAM AFTER THE PROPOSED ROADWAY PROFILE FOR CENTRAL AVENUE IS ESTABLISHED. VALUE SHOWN IS BASED ON EXISTING ROADWAY ELEVATIONS.

SP06

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
ABUTMENT PLAN AND ELEVATION-ALTERNATIVE "A-2"
ALICEANNA STREET OVER HARFORD RUN

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



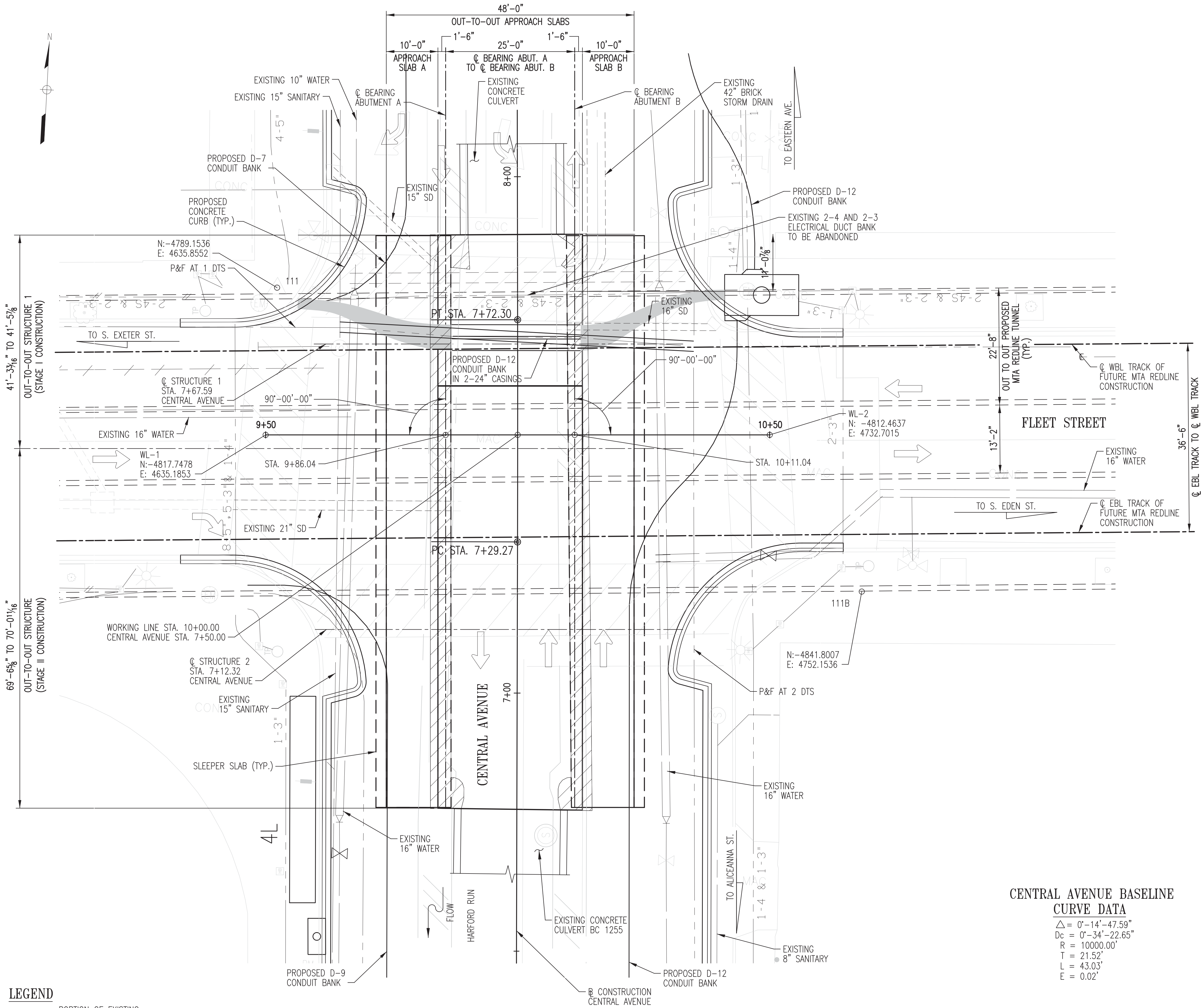
SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

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REVISIONS			
NO.	DESCRIPTION	DATE	BY

GENERAL NOTES

SPECIFICATIONS:	ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH SHA SPECIFICATIONS DATED 2008, INCLUDING ALL REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIALS AND CONSTRUCTION.
	AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS DATED 2012 (6th EDITION)
	CONCRETE DESIGN: LOAD AND RESISTANCE FACTOR (LRFD) DESIGN
	REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI.
PRESTRESSED CONCRETE DESIGN:	PRESTRESSED CONCRETE DESIGN: LOAD AND RESISTANCE FACTOR DESIGN METHOD, MAXIMUM ALLOWABLE TENSILE STRESS IN PRE-COMPRESSED TENSILE ZONE = $3/f'_c$. THE PRECAST CONCRETE BEAMS ARE DESIGNED AS NONCOMPOSITE SIMPLE SPAN FOR ALL DEAD LOADS EXCEPT THE WEARING SURFACE. THE PRECAST BEAMS ARE DESIGNED AS COMPOSITE SIMPLE SPAN FOR LIVE LOAD AS WELL AS THE WEARING SURFACE DEAD LOAD.
	REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI (NONPRETENSIONING STEEL)
LOADING:	HL-93 PLUS 2" FUTURE WEARING SURFACE.
CONCRETE:	ALL CONCRETE FOR ABUTMENT BACKWALLS AND ENTIRE SUPERSTRUCTURE SHALL BE MIX NO. 6 (4,500 PSI). ALL OTHER STRUCTURE CONCRETE SHALL BE MIX NO. 3 (3,500 PSI.)
REINFORCING STEEL:	REINFORCING STEEL SHALL CONFORM TO A 615, GRADE 60. ALL SPLICES, NOT SHOWN, SHALL BE LAPPED AS PER BAR LAP CHARTS. MINIMUM COVER FOR ANY BAR SHALL BE 2" UNLESS OTHERWISE NOTED, WITH THE EXCEPTION OF BARS AT THE BOTTOM AND SIDES OF ALL FOOTINGS WHICH SHALL HAVE 3" MINIMUM COVER.
	FOR TIES AND STIRRUPS; STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCES.
	ONLY GRADE 60 CAN BE USED ON THIS PROJECT
	REINFORCING STEEL IN THE FOLLOWING AREAS SHALL BE EPOXY COATED: -ENTIRE SUPERSTRUCTURE -ABUTMENT BACKWALLS -ALL BEARING SEAT PADS -ABUTMENT BRIDGE SEAT AREAS -APPROACH SLABS -SLEEPER SLABS
KEYS:	ALL KEYS ARE NOMINAL SIZE.
PRESTRESSED CONCRETE:	THE MINIMUM COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE AT THE AGE OF 28 DAYS SHALL BE $f'_c=7,000$ PSI. THE MINIMUM COMPRESSIVE STRENGTH AT THE TRANSFER OF PRESTRESS SHALL BE $f'_c=5,700$ PSI.
PRESTRESSED STRANDS:	PRETENSIONING STEEL SHALL CONSIST OF .6" DIAMETER 7-WIRE BRIGHT LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF M 203, GRADE 270. EACH .6" STRAND SHALL BE PRETENSIONED TO 43,943 LBS (0.75 F'S). AFTER ESTIMATED LOSSES OF 3,533 LBS., THE FINAL EFFECTIVE PRESTRESS FORCE PER STRAND IS 40,410 LBS. CAMBER GROWTH IN PRETENSIONED BEAMS BETWEEN THE TIME OF STRESSING AND THE TIME OF SLAB PLACEMENT IS ASSUMED TO BE 60% FOR CAMBER CALCULATIONS.
HANDLING PRESTRESSED UNITS:	IN HANDLING, THE UNITS MUST BE MAINTAINED IN AN UPRIGHT POSITION AT ALL TIMES AND MUST BE PICKED UP ONLY BY MEANS OF LIFTING DEVICES PROVIDED.
EXISTING STRUCTURE:	ALL DIMENSIONS AFFECTED BY THE GEOMETRICS, AND/OR EXISTING STRUCTURE SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR, BEFORE ANY CONSTRUCTION IS DONE, AND BEFORE ANY REINFORCING STEEL, ETC., IS ORDERED AND FABRICATED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY THE ENGINEER WITH ALL FIELD DIMENSIONS REQUIRED TO CHECK DETAIL DRAWINGS. THE \pm MARKS SHOWN WITH DIMENSIONS AND STATIONS DO NOT INDICATE ANY DEGREE OF PRECISION. THESE MARKS (\pm) INDICATE EXISTING DIMENSIONS AND STATIONS THAT MAY VARY AND DO REQUIRE FIELD VERIFICATION BY THE CONTRACTOR.
	EXISTING STRUCTURE SHOWN IN LONG DASHED LINES.
	PORTIONS OF EXISTING STRUCTURES SHOWN HATCHED, TO BE REMOVED.
EXISTING PLANS:	FOR THE CONVENIENCE AND INFORMATION OF BIDDERS, PRINTS OF PLANS OF THE EXISTING PERTINENT STRUCTURES ARE AVAILABLE AT THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, FOR THE CONTRACTOR'S REVIEW. NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS IS ASSUMED BY THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION. DIMENSIONS, DETAILS, ETC. AS SHOWN THEREON MAY NOT BE "AS BUILT".
UTILITIES:	THE DESIGN-BUILDER IS RESPONSIBLE FOR IDENTIFYING, LOCATING, AND RELOCATING, AS NECESSARY, ALL EXISTING UTILITIES WITHIN THE PROJECT AREA. THE UTILITIES SHOWN HEREON ARE FOR REFERENCE ONLY AND THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, TAKES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE UTILITY INFORMATION SHOWN HEREON.



CENTRAL AVENUE BASELINE
CURVE DATA
 $\Delta = 0^\circ-14'-47.59''$
 $D_c = 0'-34'-22.65''$
 $R = 10000.00'$
 $T = 21.52'$
 $L = 43.03'$
 $E = 0.02'$

LEGEND

PORTION OF EXISTING ABUTMENT TO BE REMOVED (TYP.)

PLAN
SCALE: 1"=10'-0"

DRAWN BY: K.W.F.
EXAMINED BY: N.Z.



CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA, NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
GENERAL PLAN - ALTERNATIVE "F-1"
FLEET STREET OVER HARFORD ROAD

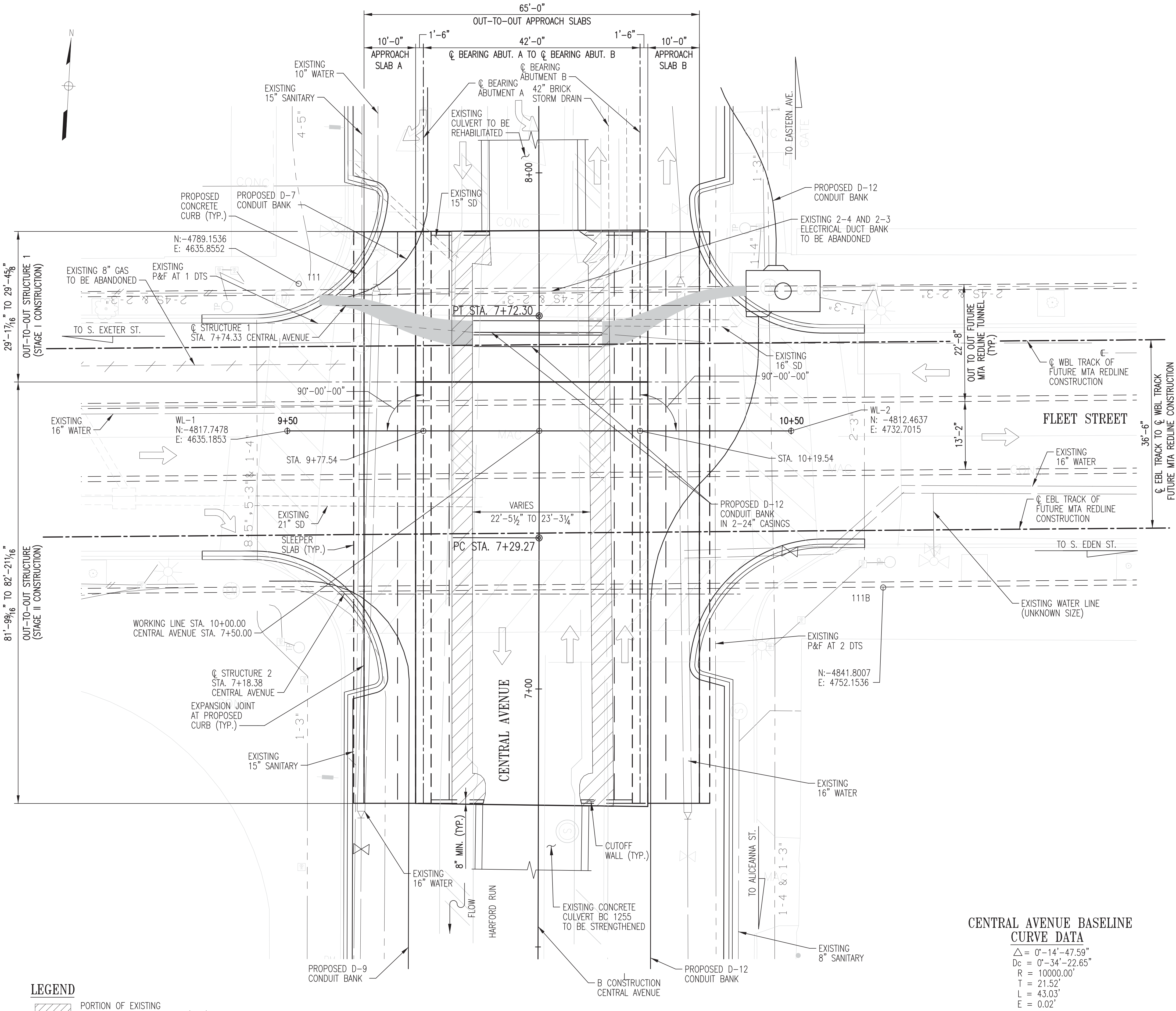
SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

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REVISIONS			
NO.	DESCRIPTION	DATE	BY

GENERAL NOTES

- SPECIFICATIONS:
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- PRESTRESSED CONCRETE DESIGN:
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- REINFORCING STEEL DESIGN: $F_y = 60,000$ PSI (NONPRETENSIONING STEEL)
- LOADING:
- HL-93 PLUS 2" FUTURE WEARING SURFACE.
- CONCRETE:
- ALL CONCRETE FOR PILE CAP, ABUTMENT STEM, BACKWALLS, APPROACH SLABS AND ENTIRE SUPERSTRUCTURE SHALL BE LIGHTWEIGHT WITH A MAXIMUM DENSITY OF 120 PCF AND A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF $f'_c=4,500$ PSI. ALL OTHER STRUCTURE CONCRETE SHALL BE MIX NO. 3 (3,500 PSI).
- REINFORCING STEEL:
- REINFORCING STEEL SHALL CONFORM TO A 615, GRADE 60. ALL SPLICES, NOT SHOWN, SHALL BE LAPPED AS PER BAR LAP CHARTS. MINIMUM COVER FOR ANY BAR SHALL BE 2" UNLESS OTHERWISE NOTED, WITH THE EXCEPTION OF BARS AT THE BOTTOM AND SIDES OF ALL FOOTINGS WHICH SHALL HAVE 3" MINIMUM COVER.
- FOR TIES AND STIRRUPS; STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCES.
- ONLY GRADE 60 CAN BE USED ON THIS PROJECT
- REINFORCING STEEL IN THE FOLLOWING AREAS SHALL BE EPOXY COATED:
- ENTIRE SUPERSTRUCTURE
 - ABUTMENT BACKWALLS
 - ALL BEARING SEAT PADS
 - ABUTMENT BRIDGE SEAT AREAS
 - APPROACH SLABS
 - SLEEPER SLABS
- KEYS:
- ALL KEYS ARE NOMINAL SIZE.
- PRESTRESSED CONCRETE:
- THE MINIMUM COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE AT THE AGE OF 28 DAYS SHALL BE $f'_c=7,000$ PSI. THE MINIMUM COMPRESSIVE STRENGTH AT THE TRANSFER OF PRESTRESS SHALL BE $f'_c=5,700$ PSI.
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- PRETENSIONING STEEL SHALL CONSIST OF .6" DIAMETER 7-WIRE BRIGHT LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF M 203, GRADE 270. EACH .6" STRAND SHALL BE PRETENSIONED TO 43,943 LBS (0.75 F_{su}). AFTER ESTIMATED LOSSES OF 4,082 LBS., THE FINAL EFFECTIVE PRESTRESS FORCE PER STRAND IS 39,861 LBS. CAMBER GROWTH IN PRETENSIONED BEAMS BETWEEN THE TIME OF STRESSING AND THE TIME OF SLAB PLACEMENT IS ASSUMED TO BE 60% FOR CAMBER CALCULATIONS.
- HANDLING PRESTRESSED UNITS:
- IN HANDLING, THE UNITS MUST BE MAINTAINED IN AN UPRIGHT POSITION AT ALL TIMES AND MUST BE PICKED UP ONLY BY MEANS OF LIFTING DEVICES PROVIDED.
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- EXISTING STRUCTURE SHOWN IN LONG DASHED LINES.
- PORTIONS OF EXISTING STRUCTURES SHOWN HATCHED, TO BE REMOVED.
- EXISTING PLANS:
- FOR THE CONVENIENCE AND INFORMATION OF BIDDERS, PRINTS OF PLANS OF THE EXISTING PERTINENT STRUCTURES ARE AVAILABLE AT THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION, FOR THE CONTRACTOR'S REVIEW. NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS IS ASSUMED BY THE CITY OF BALTIMORE, DEPARTMENT OF TRANSPORTATION. DIMENSIONS, DETAILS, ETC. AS SHOWN THEREON MAY NOT BE "AS BUILT".
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CENTRAL AVENUE BASELINE CURVE DATA

$\Delta = 0^\circ-14'-47.59''$
 $D_c = 0^\circ-34'-22.65''$
 $R = 10000.00'$
 $T = 21.52'$
 $L = 43.03'$
 $E = 0.02'$

LEGEND

PORTION OF EXISTING ABUTMENT TO BE REMOVED (TYP.)

PLAN

SCALE: 1"=10'-0"

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



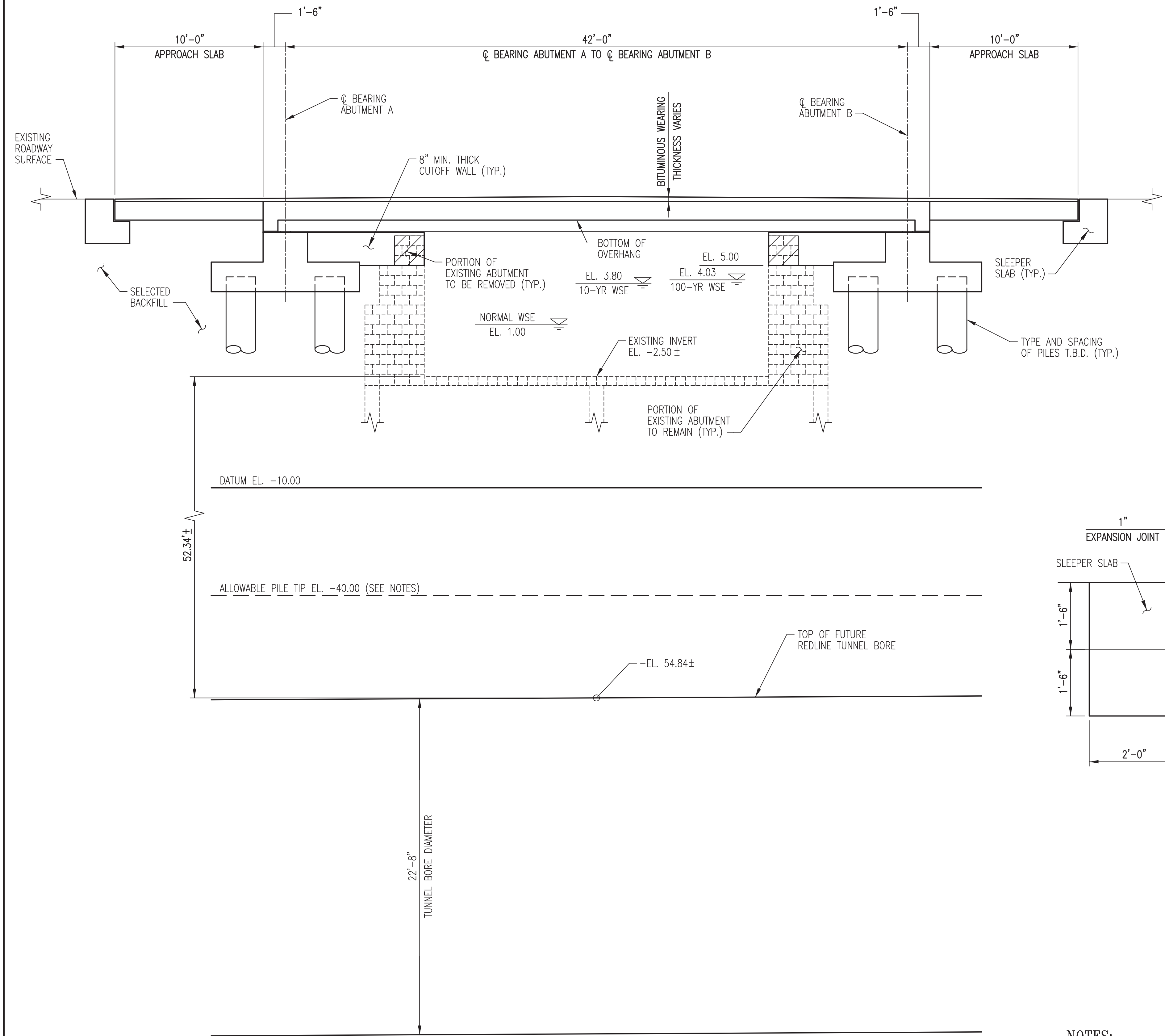
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA, NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETScape AND
HARBOR POINT CONNECTOR BRIDGE
GENERAL PLAN - ALTERNATIVE "F-2"
FLEET STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

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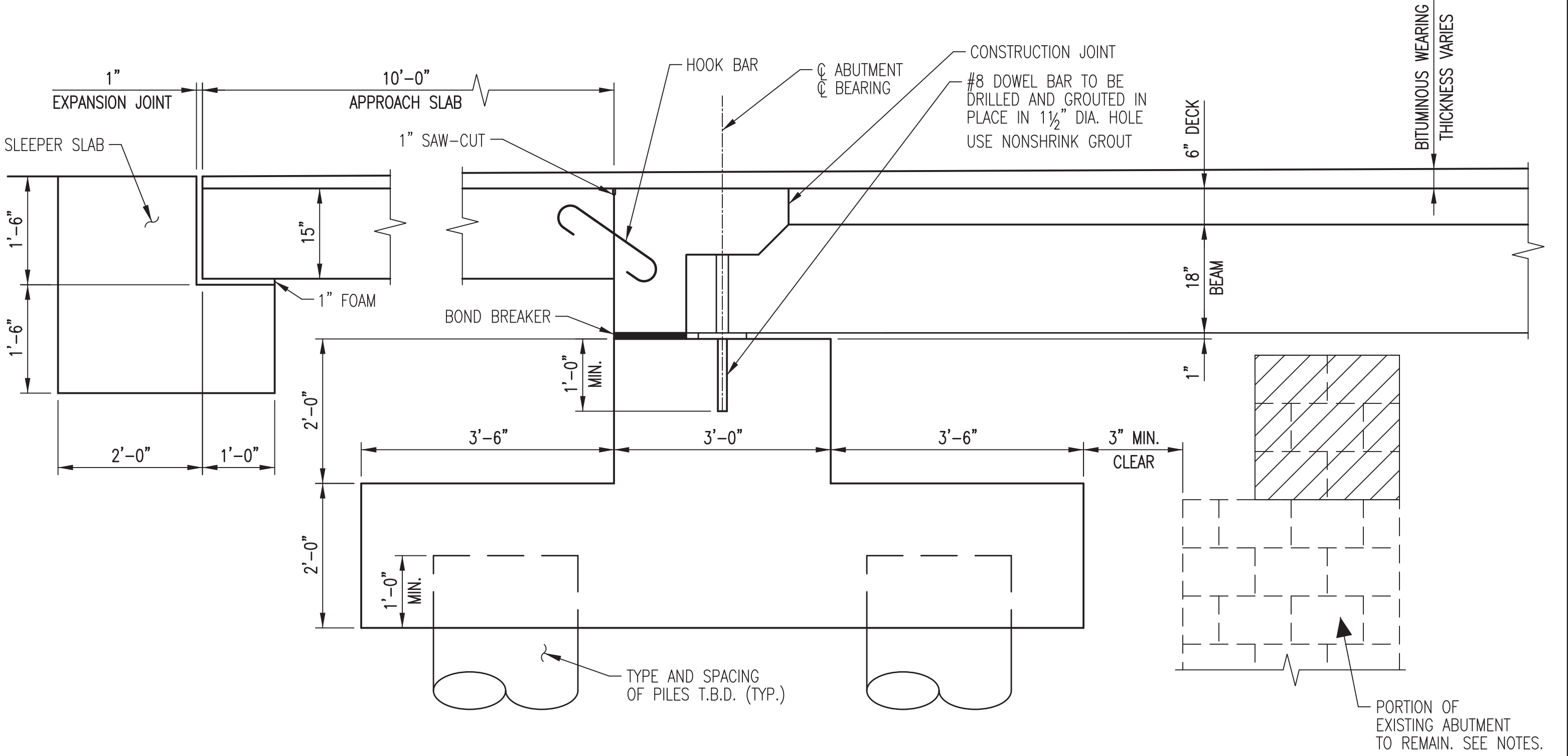
REVISIONS			
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ELEVATION
SCALE: 1/4" = 1'-0"

LEGEND
[Hatched Box] PORTION OF EXISTING ABUTMENT TO BE REMOVED (TYP.)

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



ABUTMENT TYPICAL SECTION
SCALE: 3/4" = 1'-0"

NOTES:
LOCATION, SIZE, EXTENT, AND CONFIGURATION OF THE EXISTING ABUTMENT IS BASED OFF OF LIMITED AVAILABLE PLANS. THE BALTIMORE CITY DEPARTMENT OF TRANSPORTATION MAKES NO GUARANTEES AS TO THE ACCURACY OF THE INFORMATION SHOWN. THE DESIGN BUILD TEAM SHALL MAKE ITS OWN DETERMINATION REGARDING THE LOCATION, SIZE, EXTENT AND CONFIGURATION OF THE EXISTING ABUTMENTS PRIOR TO LOCATING THE PROPOSED ABUTMENTS AND SETTING THE SPAN LENGTH OF THE PROPOSED BRIDGE TO BE CONSTRUCTED UNDER THIS CONTRACT.

MAXIMUM ALLOWABLE PILE TIP ELEVATION OF EL. -40.00 SHALL NOT BE EXCEEDED TO AVOID CONFLICT WITH FUTURE MTA RED LINE TUNNEL.

SP08

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
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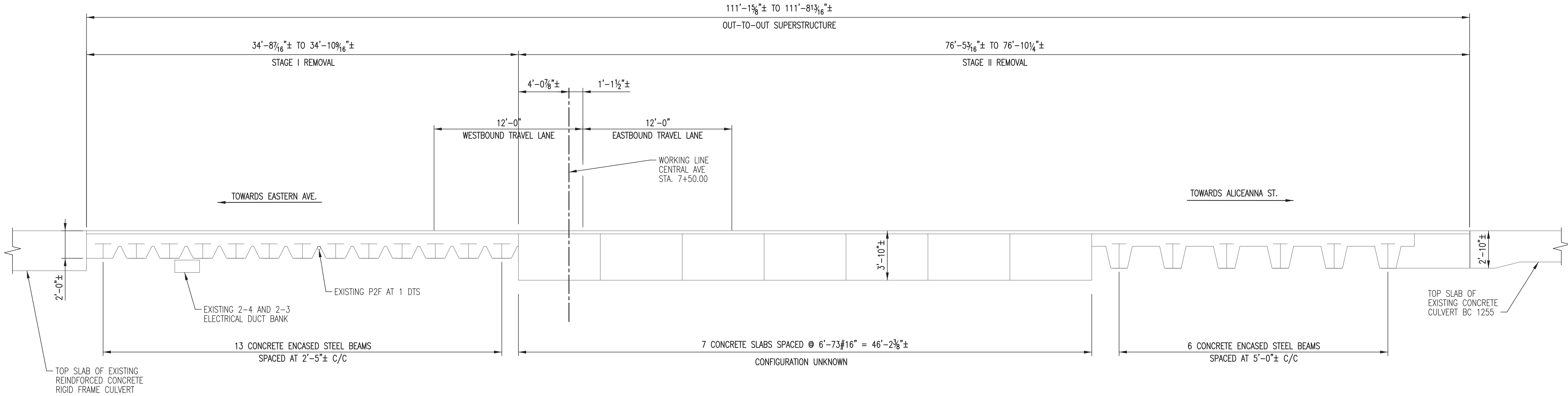
CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
ELEVATION AND ABUTMENT TYPICAL SECTION
ALT. "F-2" FLEET STREET OVER HARFORD RUN

SCALE: AS SHOWN
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION

DATE: OCTOBER, 2012
SHEET OF

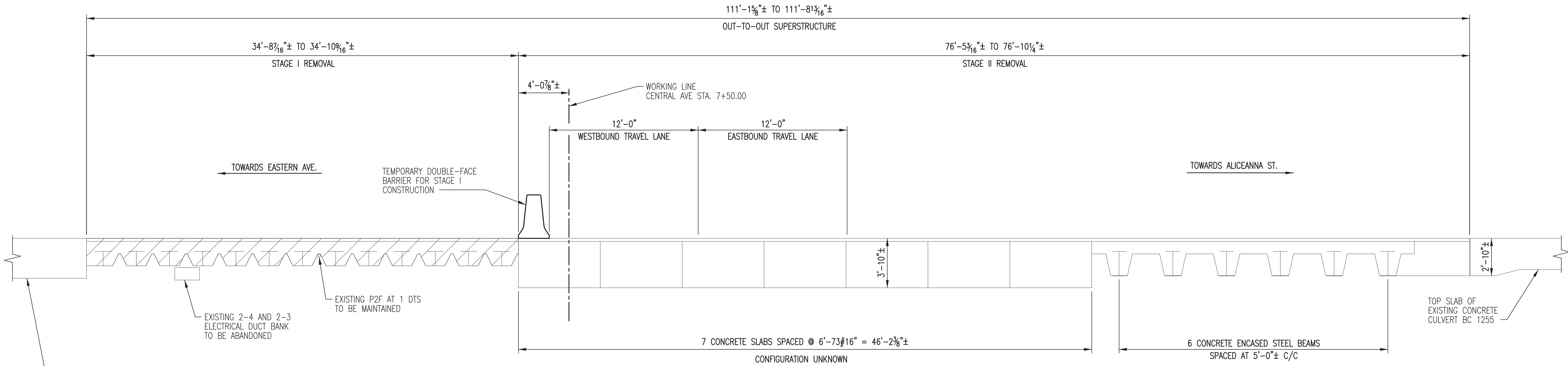


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EXISTING TYPICAL SECTION

SCALE: 1/4"=1'-0"



STAGE I REMOVAL TYPICAL SECTION

SCALE: 1/4"=1'-0"

LEGEND

PORTION OF EXISTING SUPERSTRUCTURE
TO BE REMOVED (TYP.)

NOTE:

EXISTING TYPICAL SECTION BASED ON FIELD SURVEY
BY WR&A ON JUNE, 2012. SHOWN FOR INFORMATION
ONLY. DESIGN-BUILD TEAM IS RESPONSIBLE FOR
VERIFYING THE AS BUILT DIMENSIONS PRIOR TO
CONSTRUCTION.

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



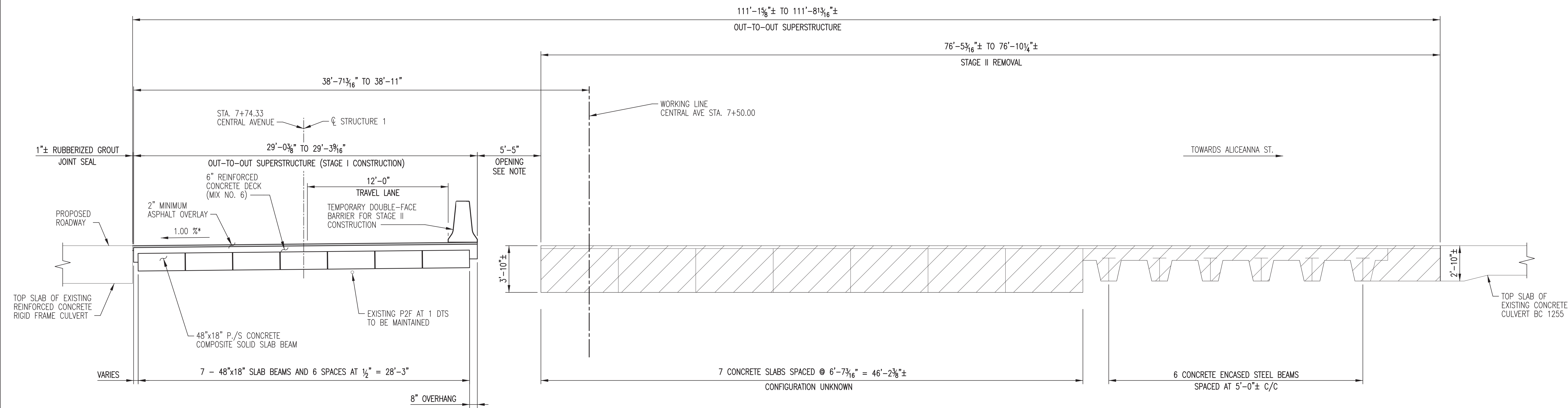
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETScape AND
HARBOR POINT CONNECTOR BRIDGE
EXISTING TYPICAL SECTION
FLEET STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

SP09

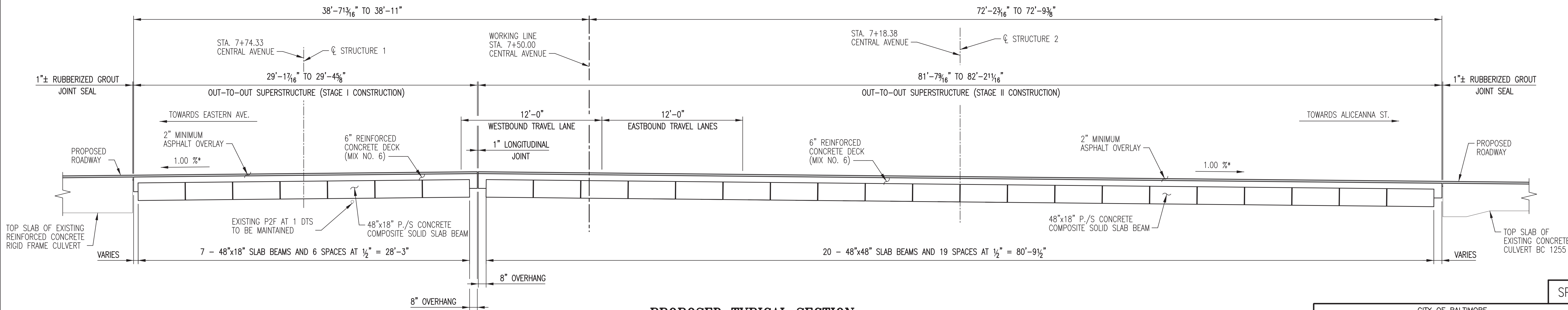
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NO.	DESCRIPTION	DATE	BY



NOTE:
OPENING BETWEEN STAGE I CONSTRUCTION AND EXISTING STRUCTURE IS TO BE COVERED BY STIFFENED PLATES OR SIMILAR TO MAINTAIN TRAFFIC BETWEEN STAGE I CONSTRUCTION AND THE START OF STAGE II REMOVAL.

STAGE II REMOVAL TYPICAL SECTION

SCALE: 1/4"=1'-0"



PROPOSED TYPICAL SECTION

SCALE: 1/4"=1'-0"

*- FINAL CROSS-SLOPE OF STRUCTURE TO BE SET BY DESIGN-BUILD TEAM AFTER THE PROPOSED ROADWAY PROFILE FOR CENTRAL AVENUE IS ESTABLISHED. VALUE SHOWN IS BASED ON EXISTING ROADWAY ELEVATIONS.

LEGEND
PORTION OF EXISTING SUPERSTRUCTURE TO BE REMOVED (TYP.)

DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



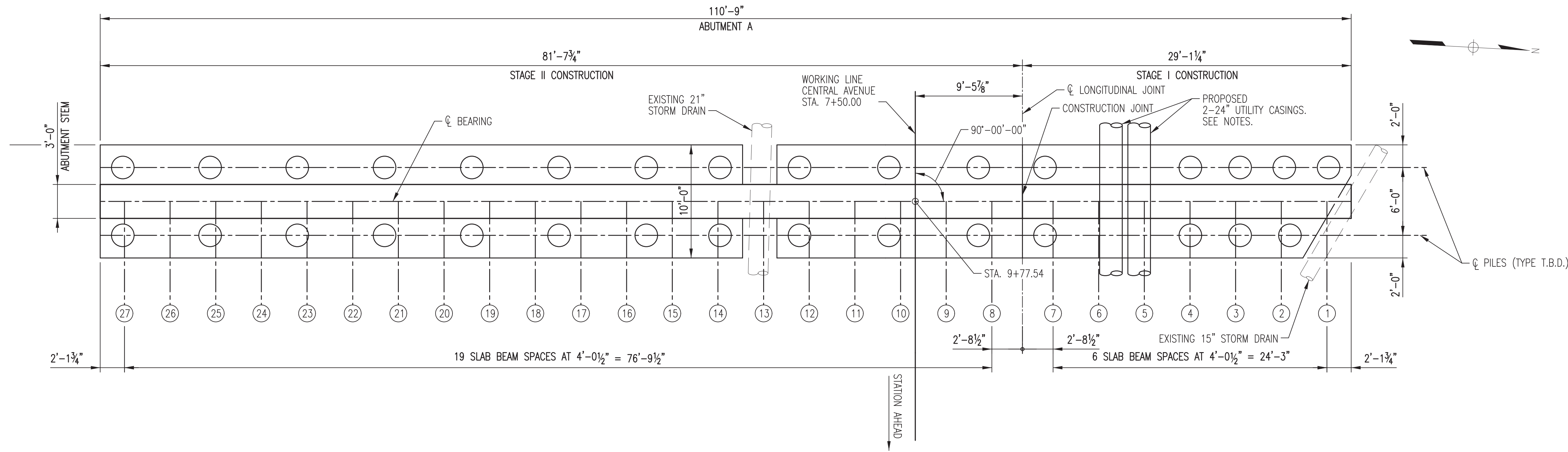
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
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SHA, NO. PENDING
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CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
TYPICAL SECTION – ALTERNATIVE "F-2"
FLEET STREET OVER HARFORD RUN

SCALE: AS SHOWN
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION

DATE: OCTOBER, 2012
SHEET OF

REVISIONS			
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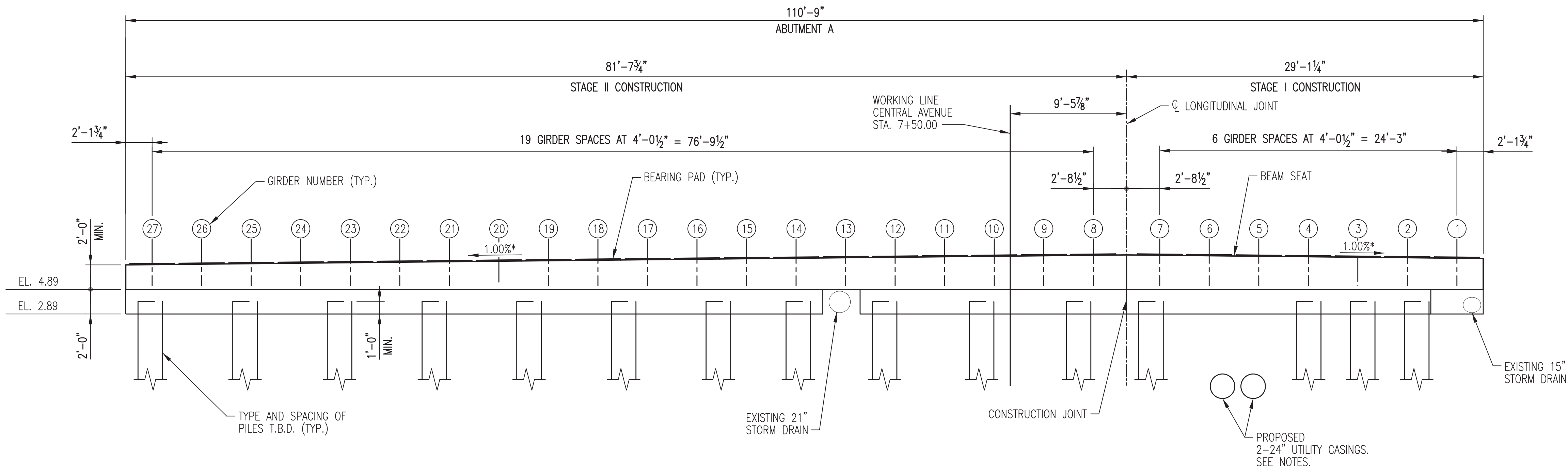


NOTES:

ABUTMENT A SHOWN. ABUTMENT B SIMILAR BUT OPPOSITE HAND. EXISTING ABUTMENT NOT SHOWN FOR CLARITY.

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DRAWN BY: K.W.F.
EXAMINED BY: J.G.V./W.A.G.



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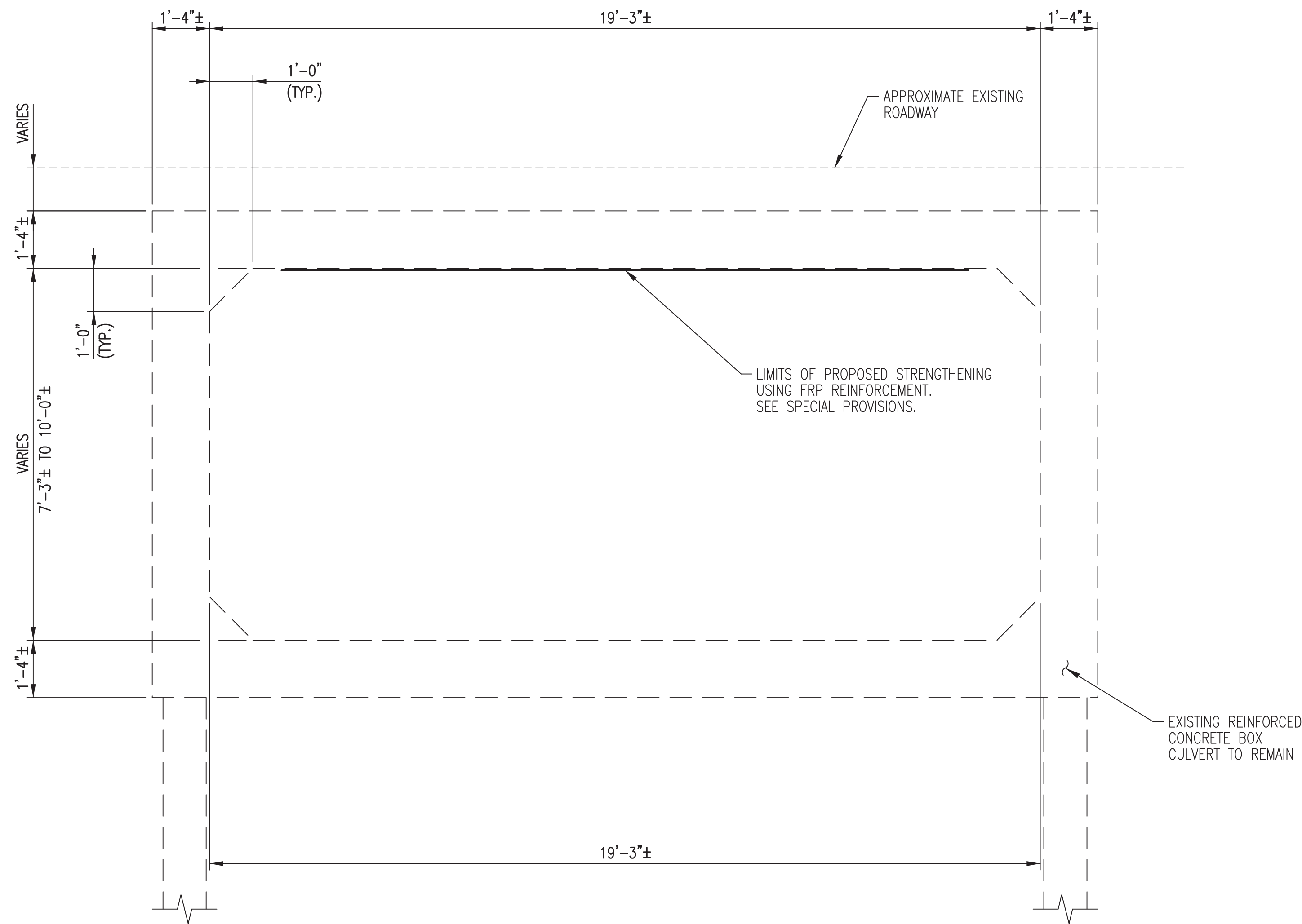
CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
ABUTMENT PLAN AND ELEVATION-ALTERNATIVE "F-2"
FLEET STREET OVER HARFORD RUN

SCALE: AS SHOWN
DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

SP11

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REVISIONS			
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PROPOSED TYPICAL SECTION (STRENGTHENING)

SCALE: 1/2"=1'-0"

DRAWN BY: K.W.F.
EXAMINED BY: N.Z.



CITY OF BALTIMORE
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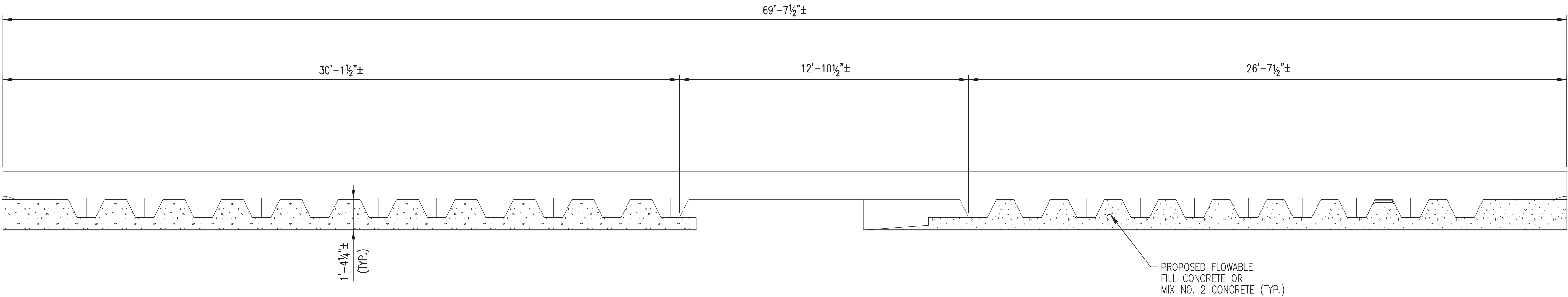
CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
TYPICAL SECTION – STRENGTHENING OF EXISTING
CULVERTS USING FRP REINFORCEMENT

SCALE: AS SHOWN
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION

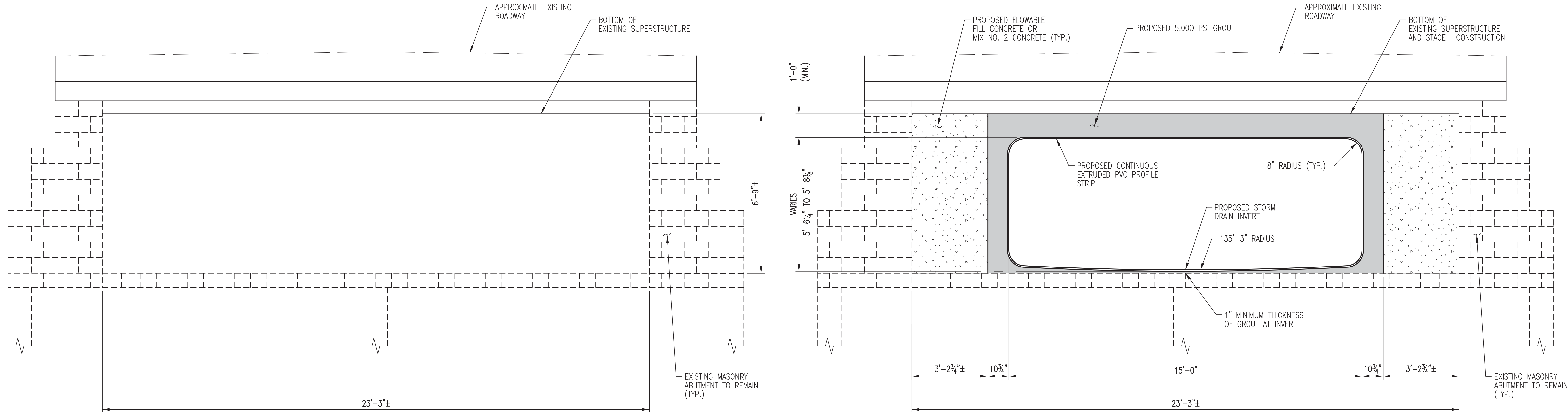
DATE: OCTOBER, 2012
SHEET OF

N:\31576-007\CADD\Bridge\31576007TS08.dgn

REVISIONS			
NO.	DESCRIPTION	DATE	BY



STAGE I CONSTRUCTION (LONGITUDINAL SECTION)
SCALE: 3/8"=1'-0"



STAGE II CONSTRUCTION (TYPICAL SECTION)
SCALE: 1/2"=1'-0"

EXISTING TYPICAL SECTION
SCALE: 1/2"=1'-0"

- NOTES:
- SUGGESTED SEQUENCE OF CONSTRUCTION:
1. INSTALL APPROVED FORMWORK AND PLACE FLOWABLE FILL OR MIX NO. 2 CONCRETE TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE I CONSTRUCTION (LONGITUDINAL SECTION)".
 2. INSTALL APPROVED FORMWORK AND PLACE FLOWABLE FILL OR MIX NO. 2 CONCRETE TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE II CONSTRUCTION (TYPICAL SECTION)".
 3. SEE NECESSARY BULKHEADS, BRACING SYSTEM(S), AND OTHER NECESSARY TEMPORARY WORKS TO SET THE PROPOSED CONTINUOUS EXTRUDED PVC PROFILE STRIP TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE II CONSTRUCTION (TYPICAL SECTION)".
 4. PLACE PROPOSED 5,000 PSI GROUT.
 5. REFERENCE APPLICABLE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND INFORMATION.

APPROXIMATE ANNULAR SPACE FOR GROUT
30± S.F.



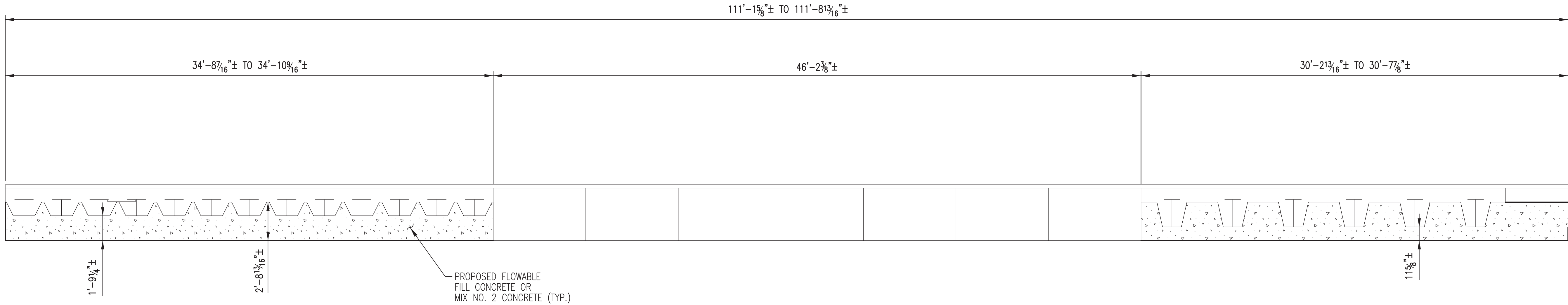
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
TYPICAL SECTIONS – STRUCTURAL LINING OPTION
ALICEANNA STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

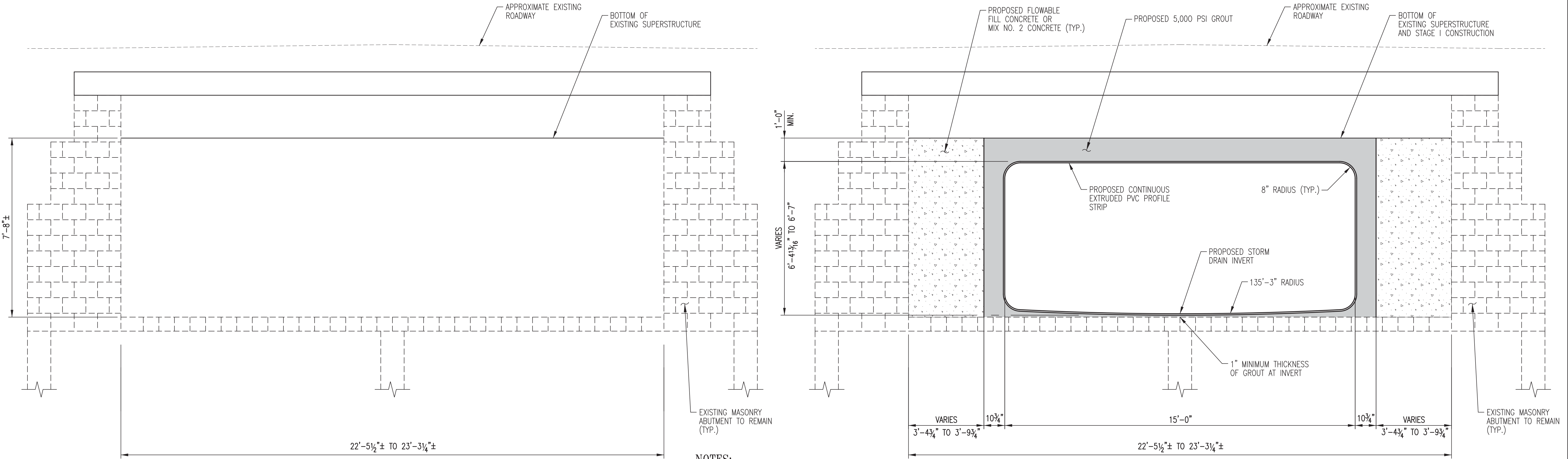
DRAWN BY: K.W.F.
EXAMINED BY: N.Z.

REVISIONS			
NO.	DESCRIPTION	DATE	BY



STAGE I CONSTRUCTION (LONGITUDINAL SECTION)

SCALE: 1/4"=1'-0"



EXISTING TYPICAL SECTION

SCALE: 1/2"=1'-0"

NOTES:

SUGGESTED SEQUENCE OF CONSTRUCTION:

1. INSTALL APPROVED FORMWORK AND PLACE FLOWABLE FILL OR MIX NO. 2 CONCRETE TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE I CONSTRUCTION (LONGITUDINAL SECTION)".
2. INSTALL APPROVED FORMWORK AND PLACE FLOWABLE FILL OR MIX NO. 2 CONCRETE TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE II CONSTRUCTION (TYPICAL SECTION)".
3. SEE NECESSARY BULKHEADS, BRACING SYSTEM(S), AND OTHER NECESSARY TEMPORARY WORKS TO SET THE PROPOSED CONTINUOUS EXTRUDED PVC PROFILE STRIP TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE II CONSTRUCTION (TYPICAL SECTION)".
4. PLACE PROPOSED 5,000 PSI GROUT.
5. REFERENCE APPLICABLE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND INFORMATION.

STAGE II CONSTRUCTION (TYPICAL SECTION)

SCALE: 1/2"=1'-0"

APPROXIMATE ANNULAR SPACE FOR GROUT
31± S.F.



CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

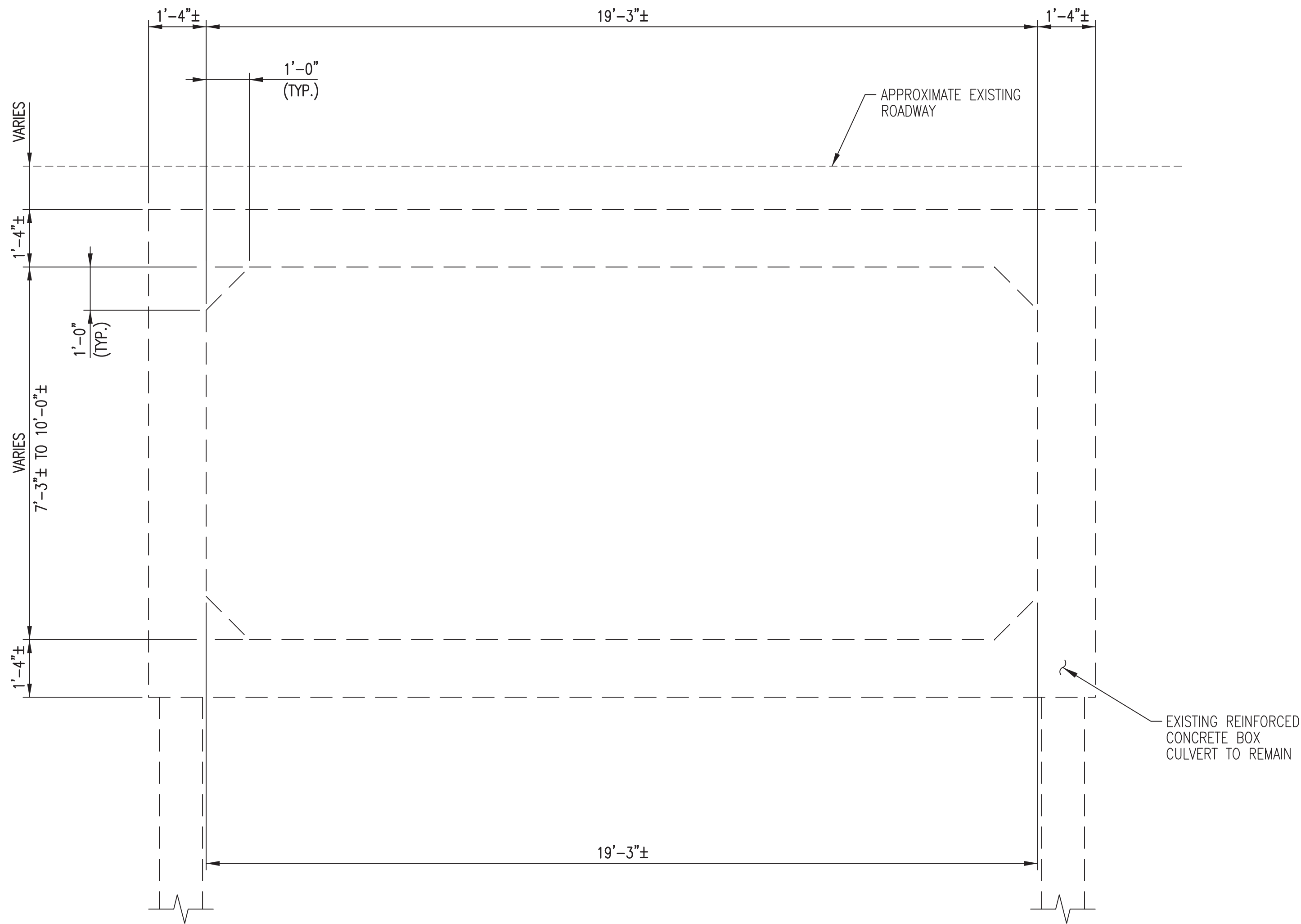
CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
TYPICAL SECTIONS – STRUCTURAL LINING OPTION
FLEET STREET OVER HARFORD RUN

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

DRAWN BY: K.W.F.
EXAMINED BY: N.Z.

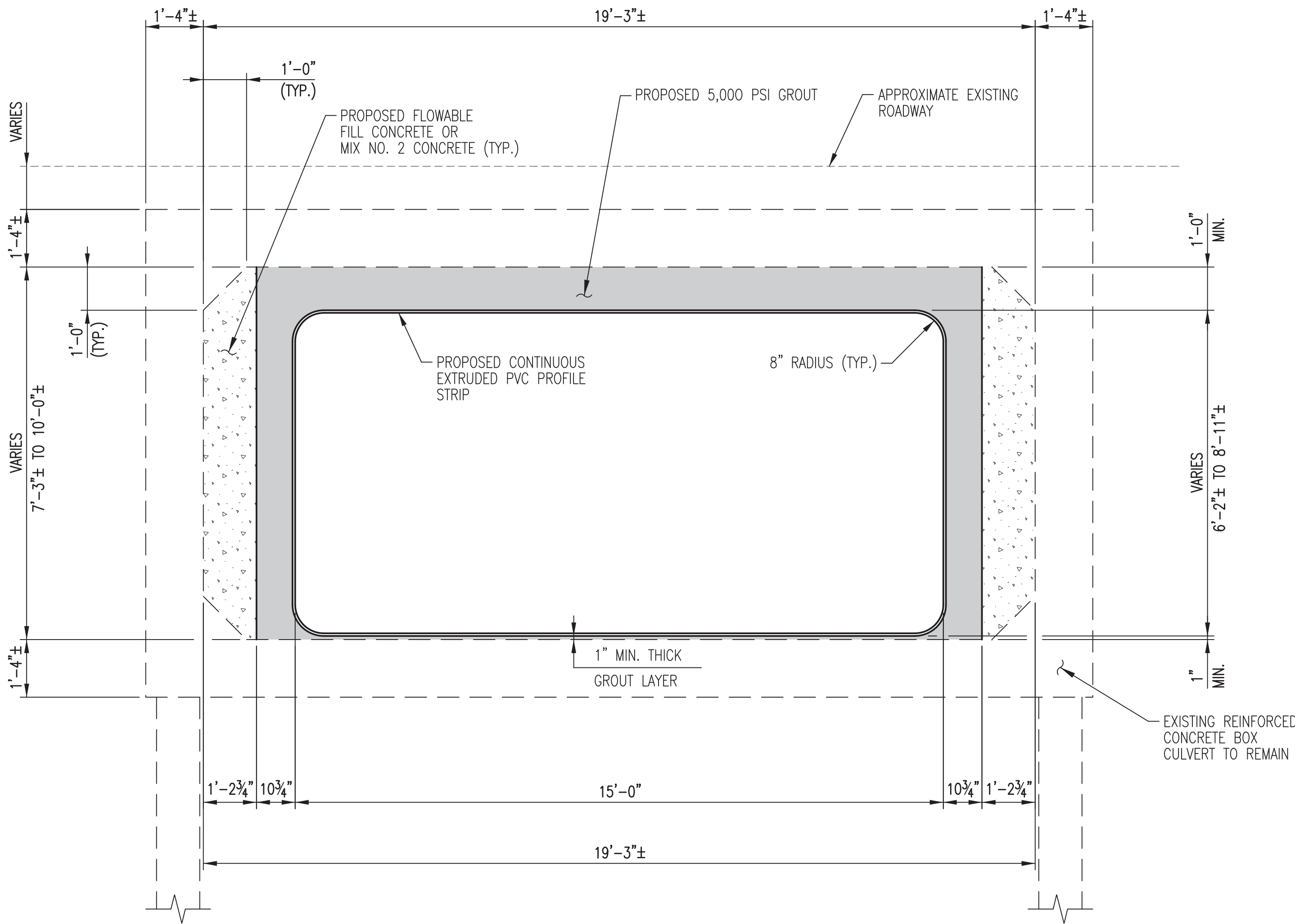
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REVISIONS			
NO.	DESCRIPTION	DATE	BY



EXISTING TYPICAL SECTION

SCALE: 1/2"=1'-0"



STAGE I CONSTRUCTION (TYPICAL SECTION)

SCALE: 1/2"=1'-0"

- NOTES:**
- SUGGESTED SEQUENCE OF CONSTRUCTION:
1. INSTALL APPROVED FORMWORK AND PLACE FLOWABLE FILL OR MIX NO. 2 CONCRETE TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE I CONSTRUCTION (TYPICAL SECTION)".
 2. SEE NECESSARY BULKHEADS, BRACING SYSTEM(S), AND OTHER NECESSARY TEMPORARY WORKS TO SET THE PROPOSED CONTINUOUS EXTRUDED PVC PROFILE STRIP TO THE LIMITS SHOWN ON THE DETAIL VIEW "STAGE II CONSTRUCTION (TYPICAL SECTION)".
 3. PLACE PROPOSED 5,000 PSI GROUT.
 4. REFERENCE APPLICABLE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND INFORMATION.

**APPROXIMATE ANNULAR
SPACE FOR GROUT
32± S.F.**

DRAWN BY: K.W.F.
EXAMINED BY: N.Z.



CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. TR12317
SHA. NO. PENDING
F.A.P. PENDING

CENTRAL AVENUE STREETSCAPE AND
HARBOR POINT CONNECTOR BRIDGE
TYPICAL SECTIONS – STRUCTURAL LINING OPTION
CULVERTS

SCALE: AS SHOWN DATE: OCTOBER, 2012
TRANSPORTATION ENGINEERING & CONSTRUCTION DIVISION SHEET OF

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Appendix E

ENGINEER'S CONSTRUCTION COST ESTIMATE

DEPARTMENT OF TRANSPORTATION PRELIMINARY ENGINEER'S CONSTRUCTION COST ESTIMATE

DATE: October 3, 2012

PROJECT TITLE: **RECONSTRUCTION OF CENTRAL
AVENUE, PHASE II**

PREPARED BY: JGV

CHECKED BY: WAG (10/4/2012)

ACCOUNT NO.:

PROJECT NO.: TR012317

ROADWAY = 0.59 MILES

BRIDGES = 0.05 MILES

TOTAL LENGTH = 0.64 MILES

CITY DOT PM: Michael Wilmore

PHONE NUMBER: 410-396-6913

CALENDAR DAYS FOR COMPLETION =

ADVERTISE DATE: PENDING

OPTION NO.	Alternatives	Description	Cost of Alternative	Total Option Cost	% Difference from Recommended Option
1	EXISTING ABUTMENTS	Replacement of Superstructures Utilizing Existing Abutments		\$ 1,727,750	-44%
	A-1	Aliceanna Street Bridge	\$ 578,000		
	F-1	Fleet Street Bridge	\$ 931,000		
	FRP Reinforcing	FRP Reinforcing of Existing Culverts	\$ 218,750		

2	NEW ABUTMENTS	Replacement of Entire Structure using New Abutments		\$ 3,111,750	0%
	A-2	Aliceanna Street Bridge	\$ 944,000		
	F-2	Fleet Street Bridge	\$ 1,949,000		
	FRP Reinforcing	FRP Reinforcing of Existing Culverts	\$ 218,750		

3	STRUCTURAL LINING	Extruded PVC Structural Lining of Bridges and Culverts		\$ 3,583,000	15%
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DEPARTMENT OF TRANSPORTATION PRELIMINARY ENGINEER'S CONSTRUCTION COST ESTIMATE

DATE: October 3, 2012

PROJECT TITLE: **RECONSTRUCTION OF CENTRAL AVENUE, PHASE II REPLACEMENT
OF BRIDGE AT ALICEANNA STREET ALT. "A-1"**

PREPARED BY: JGV

CHECKED BY:

ACCOUNT NO.:

PROJECT NO.: TR012317

ROADWAY = 0.59 MILES

BRIDGES = 0.05 MILES

TOTAL LENGTH = 0.64 MILES

CITY DOT PM: Michael Wilmore

PHONE NUMBER: 410-396-6913

CALENDAR DAYS FOR COMPLETION =

ADVERTISE DATE: PENDING

QUANTITY BREAK DOWNS AND FEDERAL AID PARTICIPATION PERCENTAGES ARE AS FOLLOWS:

FUNDS A - CITY OF BALTIMORE PARTICIPATING AT 100 PERCENT

FUNDS B - FEDERAL AID PARTICIPATING AT 100 PERCENT

FUNDS C -

ITEM NO.	CATEGORY CODE NO.	ITEM DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL	QUANTITY Funds - A	QUANTITY Funds - B	QUANTITY Funds - C
		CATEGORY 4 - STRUCTURES							
401	40000	Approach Slab Concrete	1	LS	\$ 110,225	\$ 110,225		1	
402	40000	Steel Plating for MOT	5,227	LBS	\$ 5	\$ 26,135		5,227	
403	40000	Disposal of Contaminated Soils	168	TON	\$ 100	\$ 16,767			
404	40001	Class #3 Excavation for Structures	220	CY	\$ 40	\$ 8,784		220	
405	40117	Removal of Existing Bridge Superstructure	1	LS	\$ 54,500	\$ 54,500		1	
406	40119	Removal of Portions of Existing Bridge Substructure	1	LS	\$ 10,500	\$ 10,500		1	
407	42303	Substructure Concrete	1	LS	\$ 30,213	\$ 30,213		1	
408	42401	Superstructure Concrete	1	LS	\$ 35,050	\$ 35,050		1	
409	42419	Prestressed Concrete 25 Foot Slab Beams	1	LS	\$ 151,242	\$ 151,242		1	
410	43304	Epoxy Coated Reinforcing Steel for Superstructure	1	LS	\$ 12,900	\$ 12,900		1	
411	43503	Drilled Holes in Existing Masonry Abutments	276	LF	\$ 5	\$ 1,380		276	
412	43901	Bituminous Concrete for Bridge Deck	41	TON	\$ 100	\$ 4,100		41	
TOTAL CATEGORY 4 COST \$						461,796			
CONTINGENCY (25%) \$						115,449			
TOTAL PROJECT COST \$						577,245			
						SAY \$	578,000		

BALTIMORE CITY
RECONSTRUCTION OF CENTRAL AVENUE, PHASE II
Replacement of Bridge BC 8019 at Aliceanna Street
Alternative "A-1"

CATEGORY CODE	ITEM DESCRIPTION	UNIT	TOTAL QTY.	UNIT PRICE	AMOUNT
40000	Approach Slab Concrete				
	Mix No. 6 Concrete - Approach Slab	CY	65	\$750.00	\$48,375
	Mix No. 6 Concrete - Sleeper Slab	CY	39	\$750.00	\$29,250
	Epoxy Coated Reinforcement Steel	LBS	20,700	\$1.50	\$31,050
	Crushed Aggregate Base	SY	155	\$10.00	\$1,550
					\$110,225
40117	Removal of Existing Bridge Superstructure	SF	2,180	\$25.00	\$54,500
40119	Removal of Portions of Existing Bridge Substructure	CY	42	\$250.00	\$10,500
42303	Substructure Concrete				
	Mix No. 6 Concrete - Abutment Cap	CY	28	\$750.00	\$21,000
	Epoxy Coated Reinforcement Steel - Abutment Cap	LBS	4,900	\$1.50	\$7,350
	Non-Epoxy Coated Reinforcement Steel - Dowels to Existing Abutment	EA	276	\$6.75	\$1,863
					\$30,213
42401	Superstructure Concrete				
	Mix No. 6 Concrete - Composite Deck	CY	43	\$750.00	\$32,250
	Bridge Roadway Joint - Rubberized Grout Joint Seal	LF	56	\$50.00	\$2,800
					\$35,050
42419	Prestressed Concrete 25 Foot Slab Beams				
	Prestressed Concrete 25 Foot Slab Beams	LS	1	\$119,242.00	\$119,242
	25 Ton Crane and Labor for Slab Beam Installation	DAY	2	\$8,000.00	\$16,000
	Plain Elastomeric Bearing Pads	EA	32	\$500.00	\$16,000
					\$151,242
43304	Epoxy Coated Reinforcing Steel for Superstructure	LBS	8,600	\$1.50	\$12,900

DEPARTMENT OF TRANSPORTATION PRELIMINARY ENGINEER'S CONSTRUCTION COST ESTIMATE

DATE: October 3, 2012

PREPARED BY: JGV

PROJECT TITLE: **RECONSTRUCTION OF CENTRAL AVENUE, PHASE II REPLACEMENT
OF BRIDGE AT ALICEANNA STREET ALT. "A-2"**

CHECKED BY:

ACCOUNT NO.:

CITY DOT PM: Michael Wilmore

PROJECT NO.: TR012317

PHONE NUMBER: 410-396-6913

ROADWAY = 0.59 MILES

CALENDAR DAYS FOR COMPLETION =

BRIDGES = 0.05 MILES

ADVERTISE DATE: PENDING

TOTAL LENGTH = 0.64 MILES

QUANTITY BREAK DOWNS AND FEDERAL AID PARTICIPATION PERCENTAGES ARE AS FOLLOWS:

FUNDS A - CITY OF BALTIMORE PARTICIPATING AT 100 PERCENT

FUNDS B - FEDERAL AID PARTICIPATING AT 100 PERCENT

FUNDS C -

ITEM NO.	CATEGORY CODE NO.	ITEM DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL	QUANTITY Funds - A	QUANTITY Funds - B	QUANTITY Funds - C
		CATEGORY 4 - STRUCTURES							
401	40000	Approach Slab Concrete	1	LS	\$ 110,225	\$ 110,225		1	
402	40000	Steel Plating for MOT	6,534	LBS	\$ 5	\$ 32,670		6,534	
403	40000	12 Inch Diameter Steel Pipe Pile	1,795	LF	\$ 95	\$ 170,525		1,795	
404	40000	12 Inch Diameter Steel Pipe Test Pile	95	LF	\$ 150	\$ 14,250		95	
405	40000	Disposal of Contaminated Soils	247	TON	\$ 100	\$ 24,705		247	
406	40001	Class #3 Excavation for Structures	349	CY	\$ 40	\$ 13,960		349	
407	40117	Removal of Existing Bridge Superstructure	1	LS	\$ 54,500	\$ 54,500		1	
408	40119	Removal of Portions of Existing Bridge Substructure	1	LS	\$ 8,000	\$ 8,000		1	
409	41985	Pile Load Test	2	EA	\$ 2,500	\$ 5,000		2	
410	42303	Substructure Concrete	1	LS	\$ 49,613	\$ 49,613		1	
411	42401	Superstructure Concrete	1	LS	\$ 48,250	\$ 48,250		1	
412	42419	Prestressed Concrete 37 Foot Slab Beams	1	LS	\$ 197,273	\$ 197,273		1	
413	43304	Epoxy Coated Reinforcing Steel for Superstructure	1	LS	\$ 17,700	\$ 17,700		1	
414	43901	Bituminous Concrete for Bridge Deck	78	TON	\$ 100	\$ 7,800		78	
TOTAL CATEGORY 4 COST						\$ 754,471			
CONTINGENCY (25%)						\$ 188,618			
TOTAL PROJECT COST						\$ 943,088			
						SAY \$ 944,000			

BALTIMORE CITY
RECONSTRUCTION OF CENTRAL AVENUE, PHASE II
Replacement of Bridge BC 8019 at Aliceanna Street
Alternative "A-2"

CATEGORY CODE	ITEM DESCRIPTION	UNIT	TOTAL QTY.	UNIT PRICE	AMOUNT
40000	Approach Slab Concrete				
	Mix No. 6 Concrete - Approach Slab	CY	65	\$750.00	\$48,375
	Mix No. 6 Concrete - Sleeper Slab	CY	39	\$750.00	\$29,250
	Epoxy Coated Reinforcement Steel	LBS	20,700	\$1.50	\$31,050
	Crushed Aggregate Base	SY	155	\$10.00	\$1,550
					\$110,225
40117	Removal of Existing Bridge Superstructure	SF	2,180	\$25.00	\$54,500
40119	Removal of Portions of Existing Bridge Substructure	CY	32	\$250.00	\$8,000
42303	Substructure Concrete				
	Mix No. 6 Concrete - Pile Cap	CY	49	\$750.00	\$36,750
	Epoxy Coated Reinforcement Steel - Abutment Cap	LBS	8,575	\$1.50	\$12,863
					\$49,613
42401	Superstructure Concrete				
	Mix No. 6 Concrete - Composite Deck	CY	59	\$750.00	\$44,250
	Bridge Roadway Joint - Rubberized Grout Joint Seal	LF	80	\$50.00	\$4,000
					\$48,250
42419	Prestressed Concrete 37 Foot Slab Beams				
	Prestressed Concrete 37 Foot Slab Beams	LS	1	\$164,273.00	\$164,273
	40 Ton Crane and Labor for Slab Beam Installation	DAY	2	\$8,500.00	\$17,000
	Plain Elastomeric Bearing Pads	EA	32	\$500.00	\$16,000
					\$197,273
43304	Epoxy Coated Reinforcing Steel for Superstructure	LBS	11,800	\$1.50	\$17,700

DEPARTMENT OF TRANSPORTATION PRELIMINARY ENGINEER'S CONSTRUCTION COST ESTIMATE

DATE: October 3, 2012

PREPARED BY: JGV

PROJECT TITLE: **RECONSTRUCTION OF CENTRAL AVENUE, PHASE II REPLACEMENT
OF BRIDGE AT FLEET STREET ALT. "F-1"**

CHECKED BY:

ACCOUNT NO.:

CITY DOT PM: Michael Wilmore

PROJECT NO.: TR012317

PHONE NUMBER: 410-396-6913

ROADWAY = 0.59 MILES

CALENDAR DAYS FOR COMPLETION =

BRIDGES = 0.05 MILES

ADVERTISE DATE: PENDING

TOTAL LENGTH = 0.64 MILES

QUANTITY BREAK DOWNS AND FEDERAL AID PARTICIPATION PERCENTAGES ARE AS FOLLOWS:

FUNDS A - CITY OF BALTIMORE PARTICIPATING AT 100 PERCENT

FUNDS B - FEDERAL AID PARTICIPATING AT 100 PERCENT

FUNDS C -

ITEM NO.	CATEGORY CODE NO.	ITEM DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL	QUANTITY Funds - A	QUANTITY Funds - B	QUANTITY Funds - C
		CATEGORY 4 - STRUCTURES							
401	40000	Approach Slab Concrete	1	LS	\$ 175,710	\$ 175,710		1	
402	40000	Stiffened Plates for MOT	6,645	LBS	\$ 5	\$ 33,225			
403	40000	Disposal of Contaminated Soils	267	TON	\$ 100	\$ 26,730			
404	40001	Class #3 Excavation for Structures	375	CY	\$ 40	\$ 15,000		375	
405	40117	Removal of Existing Bridge Superstructure	1	LS	\$ 86,000	\$ 86,000		1	
406	40119	Removal of Portions of Existing Bridge Substructure	1	LS	\$ 7,250	\$ 7,250		1	
407	42303	Substructure Concrete	1	LS	\$ 74,885	\$ 74,885		1	
408	42401	Superstructure Concrete	1	LS	\$ 56,650	\$ 56,650		1	
409	42419	Prestressed Concrete 25 Foot Slab Beams	1	LS	\$ 239,755	\$ 239,755		1	
410	43304	Epoxy Coated Reinforcing Steel for Superstructure	1	LS	\$ 20,700	\$ 20,700		1	
411	43503	Drilled Holes in Existing Masonry Abutments	444	LF	\$ 5	\$ 2,220		444	
412	43901	Bituminous Concrete for Bridge Deck	59	TON	\$ 100	\$ 5,900		59	
TOTAL CATEGORY 4 COST \$						744,025			
CONTINGENCY (25%) \$						186,006			
TOTAL PROJECT COST \$						930,031			
						SAY \$	931,000		

BALTIMORE CITY
RECONSTRUCTION OF CENTRAL AVENUE, PHASE II
Replacement of Bridge BC 8020 at Fleet Street
Alternative "F-1"

CATEGORY CODE	ITEM DESCRIPTION	UNIT	TOTAL QTY.	UNIT PRICE	AMOUNT
40000	Approach Slab Concrete				
	Mix No. 6 Concrete - Approach Slab	CY	103	\$750.00	\$77,250
	Mix No. 6 Concrete - Sleeper Slab	CY	62	\$750.00	\$46,500
	Epoxy Coated Reinforcement Steel	LBS	33,000	\$1.50	\$49,500
	Crushed Aggregate Base	SY	246	\$10.00	\$2,460
					\$175,710
40117	Removal of Existing Bridge Superstructure	SF	3,440	\$25.00	\$86,000
40119	Removal of Portions of Existing Bridge Substructure	CY	29	\$250.00	\$7,250
42303	Substructure Concrete				
	Mix No. 6 Concrete - Abutment Cap	CY	71	\$750.00	\$53,250
	Epoxy Coated Reinforcement Steel - Abutment Cap	LBS	12,425	\$1.50	\$18,638
	Non-Epoxy Coated Reinforcement Steel - Dowels to Existing Abutment	EA	444	\$6.75	\$2,997
					\$74,885
42401	Superstructure Concrete				
	Mix No. 6 Concrete - Composite Deck	CY	69	\$750.00	\$51,750
	Bridge Roadway Joint - Longitudinal Centerline Joint	LF	28	\$75.00	\$2,100
	Bridge Roadway Joint - Longitudinal Rubberized Grout Joint Seal	LF	56	\$50.00	\$2,800
					\$56,650
42419	Prestressed Concrete 25 Foot Slab Beams				
	Prestressed Concrete 25 Foot Slab Beams	LS	1	\$188,755.00	\$188,755
	25 Ton Crane and Labor for Slab Beam Installation	DAY	3	\$8,000.00	\$24,000
	Plain Elastomeric Bearing Pads	EA	54	\$500.00	\$27,000
					\$239,755
43304	Epoxy Coated Reinforcing Steel for Superstructure	LBS	13,800	\$1.50	\$20,700

DEPARTMENT OF TRANSPORTATION PRELIMINARY ENGINEER'S CONSTRUCTION COST ESTIMATE

DATE: October 3, 2012
 PROJECT TITLE: **RECONSTRUCTION OF CENTRAL AVENUE, PHASE II REPLACEMENT
 OF BRIDGE AT FLEET STREET ALT. "F-2"**

PREPARED BY: JGV
 CHECKED BY:

ACCOUNT NO.:
 PROJECT NO.: TR012317
 ROADWAY = 0.59 MILES
 BRIDGES = 0.05 MILES
 TOTAL LENGTH = 0.64 MILES

CITY DOT PM: Michael Wilmore
 PHONE NUMBER: 410-396-6913
 CALENDAR DAYS FOR COMPLETION =
 ADVERTISE DATE: PENDING

QUANTITY BREAK DOWNS AND FEDERAL AID PARTICIPATION PERCENTAGES ARE AS FOLLOWS:

FUNDS A - CITY OF BALTIMORE PARTICIPATING AT 100 PERCENT
 FUNDS B - FEDERAL AID PARTICIPATING AT 100 PERCENT
 FUNDS C -

ITEM NO.	CATEGORY CODE NO.	ITEM DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL	QUANTITY Funds - A	QUANTITY Funds - B	QUANTITY Funds - C
		CATEGORY 4 - STRUCTURES							
401	40000	Approach Slab Concrete	1	LS	\$ 180,860	\$ 180,860		1	
402	40000	Stiffened Plates for MOT	10,659	LBS	\$ 5	\$ 53,295		10,659	
403	40000	12 Inch Diameter Steel Pipe Pile	4,840	LF	\$ 95	\$ 459,800		4,840	
404	40000	12 Inch Diameter Steel Pipe Test Pile	88	LF	\$ 150	\$ 13,200		88	
405	40000	Disposal of Contaminated Soils	527	TON	\$ 100	\$ 52,650		527	
406	40001	Class #3 Excavation for Structures	667	CY	\$ 40	\$ 26,680		667	
407	40117	Removal of Existing Bridge Superstructure	1	LS	\$ 86,000	\$ 86,000		1	
408	40119	Removal of Portions of Existing Bridge Substructure	1	LS	\$ 7,250	\$ 7,250		1	
409	41985	Pile Load Test	2	EA	\$ 2,500	\$ 5,000		2	
410	42303	Substructure Concrete	1	LS	\$ 176,000	\$ 176,000		1	
411	42401	Superstructure Concrete	1	LS	\$ 74,150	\$ 74,150		1	
412	42419	Prestressed Concrete 42 Foot Slab Beams	1	LS	\$ 387,500	\$ 387,500		1	
413	43304	Epoxy Coated Reinforcing Steel for Superstructure	1	LS	\$ 27,000	\$ 27,000		1	
414	43901	Bituminous Concrete for Bridge Deck	91	TON	\$ 100	\$ 9,100		91	
TOTAL CATEGORY 4 COST						\$ 1,558,485			
CONTINGENCY (25%)						\$ 389,621			
TOTAL PROJECT COST						\$ 1,948,106			
						SAY \$ 1,949,000			

BALTIMORE CITY
RECONSTRUCTION OF CENTRAL AVENUE, PHASE II
Replacement of Bridge BC 8019 at Aliceanna Street
Alternative "F-2"

CATEGORY CODE	ITEM DESCRIPTION	UNIT	TOTAL QTY.	UNIT PRICE	AMOUNT
40000	Approach Slab Concrete				
	Lightweight Concrete - Approach Slab	CY	103	\$800.00	\$82,400
	Mix No. 6 Concrete - Sleeper Slab	CY	62	\$750.00	\$46,500
	Epoxy Coated Reinforcement Steel	LBS	33,000	\$1.50	\$49,500
	Crushed Aggregate Base	SY	246	\$10.00	\$2,460
					\$180,860
40117	Removal of Existing Bridge Superstructure	SF	3,440	\$25.00	\$86,000
40119	Removal of Portions of Existing Bridge Substructure	CY	29	\$250.00	\$7,250
42303	Substructure Concrete				
	Lightweight Concrete - Abutment Stem	CY	60	\$800.00	\$48,000
	Lightweight Concrete - Pile Cap	CY	100	\$800.00	\$80,000
	Epoxy Coated Reinforcement Steel	LBS	32,000	\$1.50	\$48,000
					\$176,000
42401	Superstructure Concrete				
	Lightweight Concrete - Composite Deck	CY	90	\$750.00	\$67,500
	Bridge Roadway Joint - Longitudinal Centerline Joint	LF	38	\$75.00	\$2,850
	Bridge Roadway Joint - Rubberized Grout Joint Seal	LF	76	\$50.00	\$3,800
					\$74,150
42419	Prestressed Concrete 42 Foot Slab Beams				
	Prestressed Lightweight Concrete 42 Foot Slab Beams	LS	1	\$335,000.00	\$335,000
	40 Ton Crane and Labor for Slab Beam Installation	DAY	3	\$8,500.00	\$25,500
	Plain Elastomeric Bearing Pads	EA	54	\$500.00	\$27,000
					\$387,500
43304	Epoxy Coated Reinforcing Steel for Superstructure	LBS	18,000	\$1.50	\$27,000

DEPARTMENT OF TRANSPORTATION PRELIMINARY ENGINEER'S CONSTRUCTION COST ESTIMATE

DATE: October 3, 2012

PREPARED BY: JGV

PROJECT TITLE: **RECONSTRUCTION OF CENTRAL AVENUE, PHASE II INSTALLATION
OF STRUCTURAL LINING**

CHECKED BY:

ACCOUNT NO.:

CITY DOT PM: Michael Wilmore

PROJECT NO.: TR012317

PHONE NUMBER: 410-396-6913

ROADWAY = 0.59 MILES

CALENDAR DAYS FOR COMPLETION = DAYS

BRIDGES = 0.05 MILES

ADVERTISE DATE: PENDING

TOTAL LENGTH = 0.64 MILES

QUANTITY BREAK DOWNS AND FEDERAL AID PARTICIPATION PERCENTAGES ARE AS FOLLOWS:

FUNDS A - CITY OF BALTIMORE PARTICIPATING AT 100 PERCENT

FUNDS B - FEDERAL AID PARTICIPATING AT 100 PERCENT

FUNDS C -

ITEM NO.	CATEGORY CODE NO.	ITEM DESCRIPTION	QUANT.	UNIT	UNIT COST	TOTAL	QUANTITY Funds - A	QUANTITY Funds - B	QUANTITY Funds - C
		CATEGORY 4 - STRUCTURES							
401	40000	Reinforced Machine Spiral Wound PVC Liner Pipe	720	LF	\$ 3,500.00	\$ 2,520,000		720	
402	40000	Lateral Connections	20	EA	\$ 3,300.00	\$ 66,000		20	
403	42501	Mix No. 1 Subfoundation Concrete - Filling Bridge Voids	192	CY	\$ 750.00	\$ 144,000		192	
404	42501	Mix No. 1 Subfoundation Concrete - Filling Behind Lining Grout Walls	679	CY	\$ 200.00	\$ 135,740		679	
TOTAL CATEGORY 4 COST						\$ 2,865,740			
CONTINGENCY (25%)						\$ 716,435			
TOTAL PROJECT COST						\$ 3,582,175			
						SAY \$ 3,583,000			



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